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How Retail Food Markets Responded to Price Liberalization in Russia after January 1992

Bruce Gardner
and
Karen M. Brooks

Progress was made toward market integration in the seven months after price liberalization. Further development of food markets will require deeper price liberalization, removal of local controls, continued enterprise reform, privatization, demonopolization, and entry of new firms.

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This paper — a product of the Agricultural Policies Division, Agriculture and Rural Development Department — is part of a larger effort in the department to analyze changes in agriculture in economies. This research was supported by a grant to the University of Minnesota from the National Council on Soviet and Eastern European Research, and by the World Bank. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Cicely Spooner, room N8-039, extension 32116 (May 1993, 66 pages).

Under administered prices through the fall of 1991, Russia's food distribution system broke down, and it was feared that the food supply would be inadequate in the winter of 1992 and thereafter. In January and March 1992, price ceilings were removed on most items sold in state-owned Russian stores. Price liberalization was intended to return food to shelves and to improve the flow of food among regions through responses to price differentials. Privatization of the distribution system did not begin until October 1992. At the time of price liberalization the environment was still dominated by unrestructured state enterprises.

Retail prices immediately rose sharply and fluctuated. Because food prices did not stabilize after the initial jump, many people questioned whether price liberalization accomplished anything positive. Gardner and Brooks examine data on movements in food prices and volumes between December 1991 and August 1992 to examine how retail food markets responded to liberalization. They address the following questions:

Is there any evidence that after liberalization food returned to retail outlets that were essentially bare in December 1991? Is there evidence that transactions took place in response to price differentials (did markets begin to emerge despite the lack of privatization and demonopolization)? Did city-to-city price differentials evolve to reflect a price surface explainable by transportation costs and other economic variables? If not, why not?

Gardner and Brooks conclude that progress was made toward market integration in the seven months after price liberalization. The volume of food sold in monitored shops increased substantially. The geographic dispersion of prices declined over time. But large price differences between cities persisted that cannot be explained in terms of available economic variables.

Large economic gains could be achieved by further market integration.

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by
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How Retail Food Markets Responded to Price Liberalization in Russia after January 1992*

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Food prices in Russian state-owned stores were freed from national regulation in two steps in January and March 1992. Some provinces and cities retained price regulation, and in some cases even dropped and then reintroduced it. But the main policy change occurred in January with removal of price ceilings on most items sold in state-owned stores. Retail prices immediately rose sharply and fluctuated.

The price liberalization was intended as a first step toward creating active markets in the food sector. The liberalization preceded privatization and institutional reform not by design, but by exigency. Retention of administered prices throughout fall of 1991 had led to substantial breakdown in the food distribution system and concern about adequacy of food supply in winter 1992 and thereafter. The liberalization was intended to return food to shelves and to improve the flow of food among regions through response to price differentials.

Privatization of the distribution system, an important concomitant to liberalization, did not begin until the launching of the voucher scheme in October 1992.[1] Some retail outlets were privatized earlier through auctions and small-scale privatization, but these had little impact on the monopoly power of

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[1] Beginning in October 1992, all Russian citizens over the age of 18 were issued vouchers redeemable in the future against shares of state-owned enterprises.

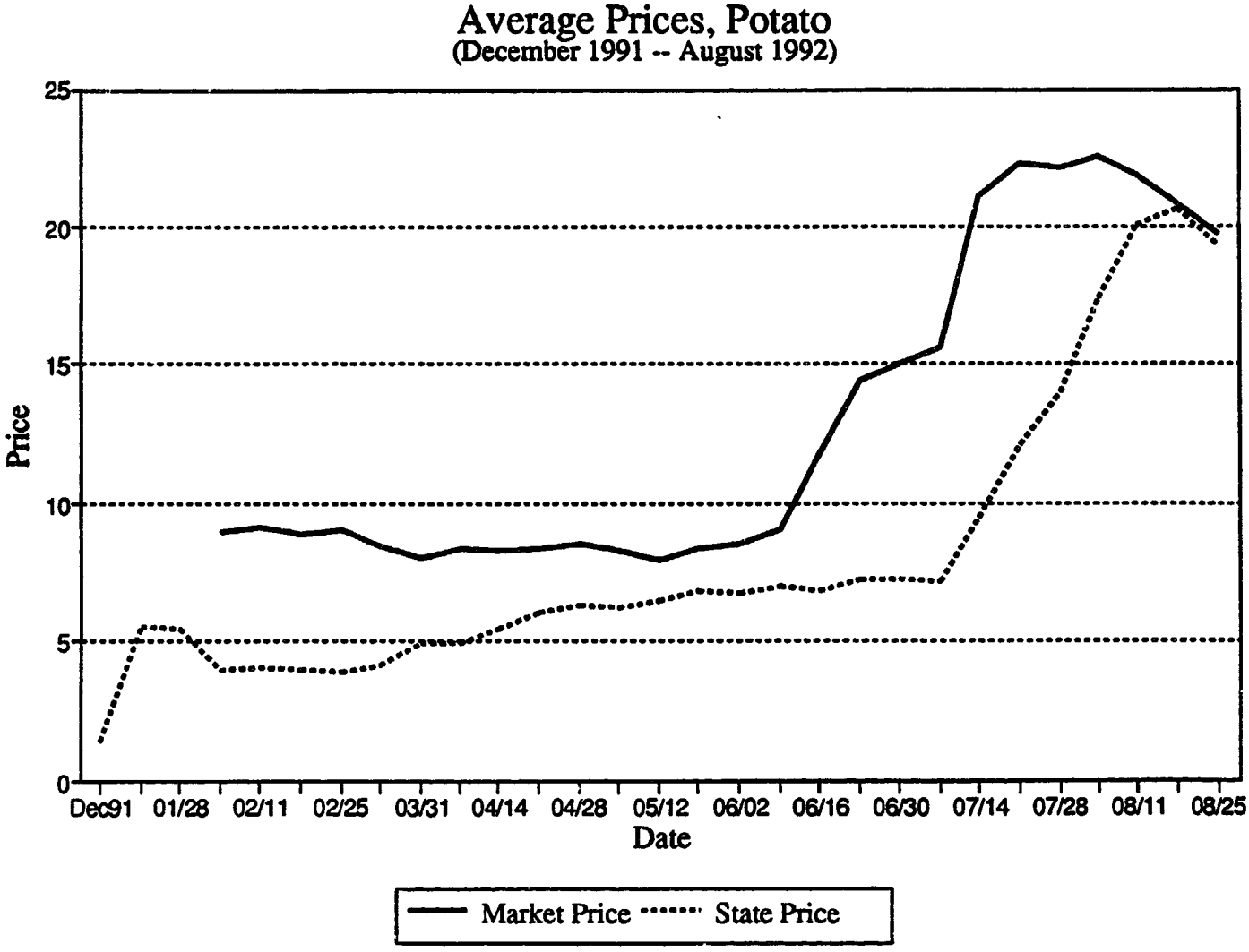
processors and distributors. Thus the price liberalization of January and March 1992 took place in an environment dominated by unrestructured state enterprises.

Food prices moved up sharply after the January liberalization and subsequently continued to climb, although somewhat lagging the general price level, throughout 1992. The fact that food prices did not stabilize after the initial jump led many people to question whether liberalization accomplished anything positive. This paper uses data on movements in food prices and volumes between December 1991 and August 1992 to examine how retail food markets responded to liberalization. Is there any evidence that after liberalization food returned to retail outlets that were essentially bare in December 1991? Is there evidence that transactions took place in response to price differentials, i.e. did markets begin to emerge despite lack of privatization and demonopolization? Did city to city price differentials evolve to reflect a price surface explainable by transportation costs and other economic variables? If not, why not? This paper attempts to answer these and related questions using data for January through August 1992.

The Data

Goskomstat of the Russian Federation began an extensive effort to collect retail food prices in January 1992. These data are organized by the Center for Economic Analysis and Forecasting and evaluated to track price movements. A weekly survey covers 69 food and related commodities in 132 cities throughout Russia. Both state-owned stores and private central markets (collective farm markets) are covered, but not individual private sellers who generally buy at the former outlets for resale on the street in small quantities.

The survey is taken on Wednesday of each week, typically with one enumerator for each 3 or 4 state stores, and one enumerator for each private central market. Not all outlets are sampled, but the sample size appears adequate—about 70 enumerators in Moscow, for example, covering about 100 state


Average Prices, Potato
(December 1991 -- August 1992)
Price
25
20
15
10
5
0
Dec91
01/28
02/11
02/25
03/31
04/14
04/28
05/12
06/02
06/16
06/30
07/14
07/28
08/11
08/25
Date
Market Price
State Price

stores and 10 collective farm markets. The enumerators record posted prices in state stores and ask the manager for volume data. In private markets the enumerators ask a sample of sellers for price quotes, and ask the market's administrator, or in some cases individual sellers for an estimate of volume sold in the market.

The data collecting agency uses the enumerators' reports to calculate for each commodity an average price in each city for state stores, an average price for collective farm markets, and estimated total volume for each type of market in the outlets surveyed. These data are then used to calculate an overall food price index for Russia. All-Russia price indexes for each commodity and for all food are published weekly.[2]

Food Prices in 1992

This paper focuses on the behavior of 19 widely sold staple commodities, which comprise a subset of the 69 commodities sampled:

beef ("category 1")
sausage ("type 1")
sausage ("type 2")
butter
vegetable oil
milk
sour cream
cheese (standard types)
eggs
sugar
bread (rye)
bread (white)
millet groats
vermicelli (spaghetti)
potatoes
cabbage
onions
apples
cigarettes

[2] Since the volume in sampled outlets does not by construction reflect the volume of transactions in state and private markets throughout Russia, the aggregate index uses adjusted weights instead of the volumes in the sample.

Volume in Monitored Outlets: Potatoes
(01/21/92--08/25/92)

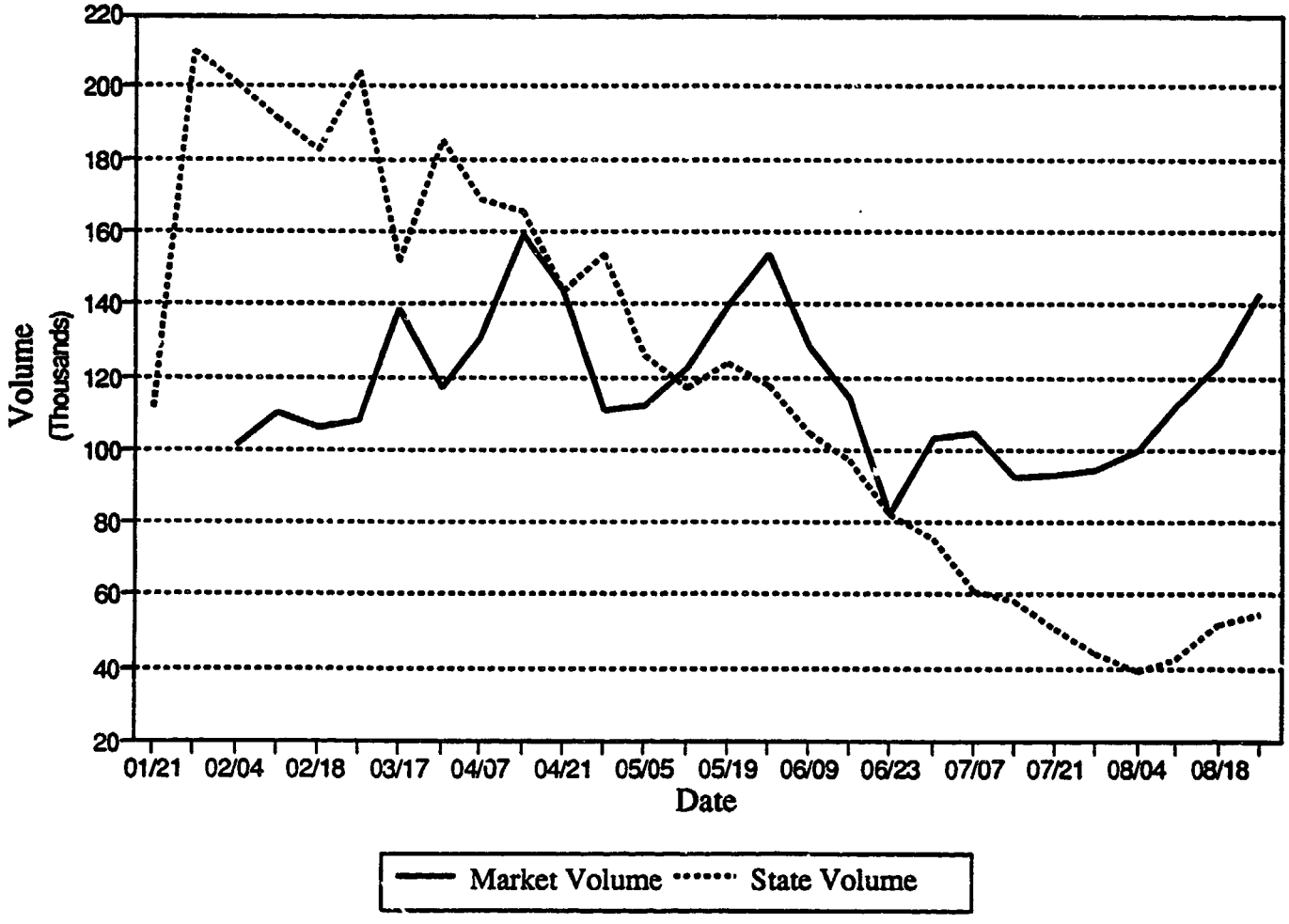


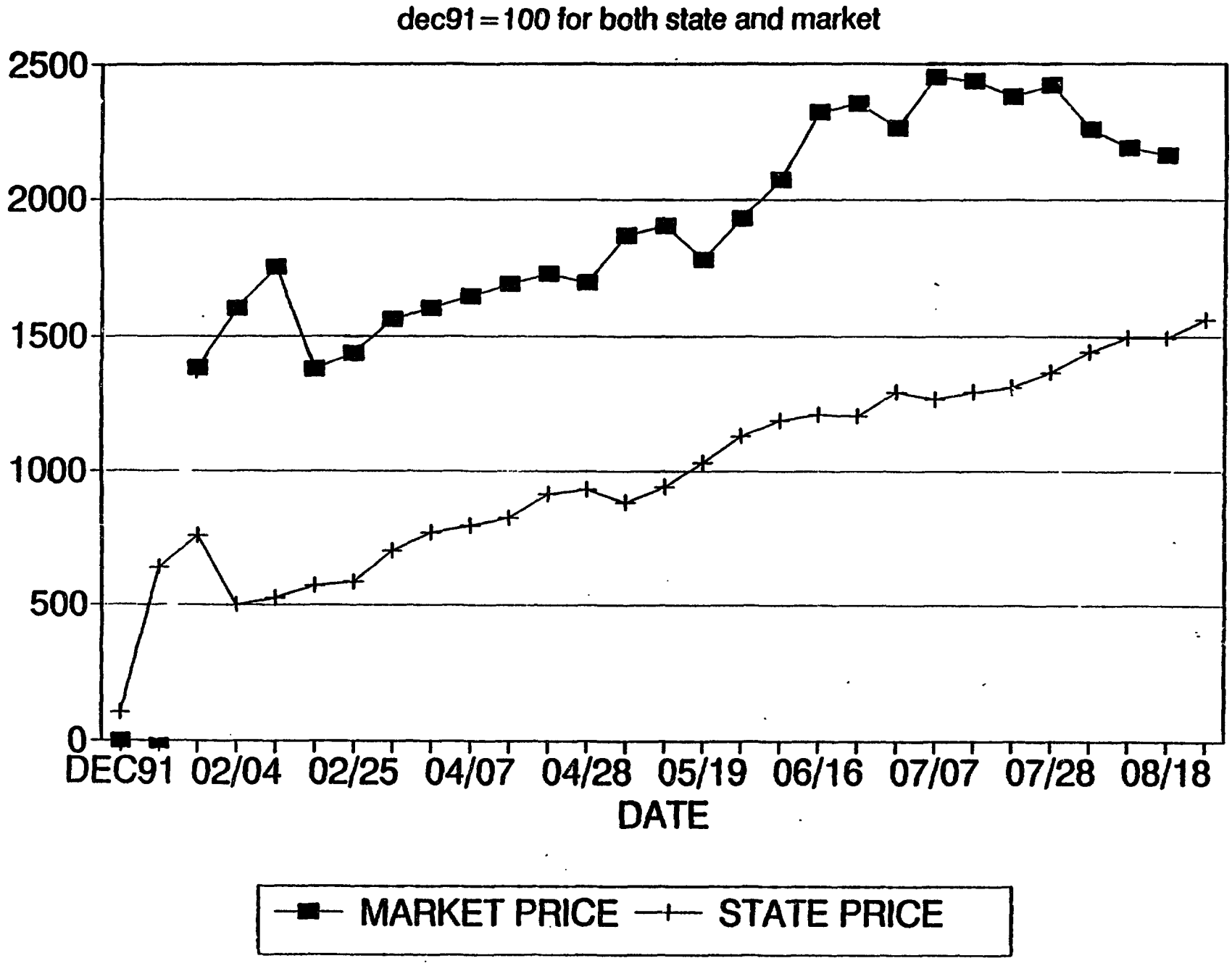
Figure 1 shows all-Russia prices of one of these commodities, potatoes. Potatoes, unlike most foods, were already sold at unregulated prices in state stores in December 1991, and most of the difference between state and free market prices reflect quality differences. The movement in potato prices after January 2, however, suggests that prices prior to that were controlled perhaps at the local level. Some of the price increase may be due to income escalators built into the January liberalization. Figure 1 plots the average price of potatoes from December 1991 through August 1992, in state stores and in private (collective farm) markets. The volume-weighted mean price of potatoes in the 132 cities surveyed was 1.48 rubles (per kilogram) in states stores in December 1991. After the liberalization of prices in January 1992, the price in state stores immediately increased to over 5 rubles per kilo.

No data were reported for potatoes in the private markets (the same is true for almost every other commodity) until February 1992. Reported prices in these markets have been generally higher in the private markets than in the state stores, but these prices were already deregulated and high in December 1991 (although we have no comparable price indexes to quantify how high private market prices were relative to state store prices in December 1991).

After the initial shock, prices rose more slowly during the first half of 1992 in both state stores and collective farm markets. Potato prices rose "only" about 50 percent between February and July in state stores, and then quadrupled in July-August. Private market prices rose rapidly, and by August had converged so that state stores and private markets sold potatoes at about the same prices.

The volume of potato sales estimated for the markets sampled in the 132 cities is shown in Figure 2. The volume in state stores rose markedly after the liberalization, even though formally potato prices had been largely freed prior to January 1992. There was no concomitant fall in volume on sampled private markets, and so total sales of potatoes increased initially, due presumably to reduction of inventories held within the distribution system. Overall, the state and private markets sampled had about

Figure 3. 132-city Price Index for All Food



an equal volume of sales in February-August. In July and August, the state stores steadily lost sales. August volume in state stores was about one-fourth of their February volume.

For 17 of the 19 core commodities, sales volume in the state sector increased following January 1992. The exceptions are eggs, for which the precipitous fall in volume, followed by roughly level sales thereafter, suggests a reporting mistake. The decline in cigarette sales in stores is sustained after the original drop, suggesting that cigarette sales may have indeed moved out of the sampled stores, perhaps to sidewalk kiosks. For the remainder of items, the increase in volume in state stores is not mirrored by a fall on private markets. These data support anecdotal reports that, after liberalization, food did in fact return to shelves of state stores. Although the liberalization did little directly to promote reorganization of the trading system, this evidence suggests that the precipitous fall in volume that caused alarm in fall 1991 was halted and reversed in January and February 1992.

For several commodities—smoked sausage, butter, milk, cheese, eggs, sugar, bread, vermicelli—volume in the private markets remained low or negligible throughout January-August 1992. Other products were sold heavily in the private markets. By August 1992 private market volume exceeded state-store volume for potatoes, apples, and beef in these sampled outlets. In most cases the private-market price substantially exceeded the price in state stores. Only for potatoes, cabbage, onions, and apples did the market and state-store prices tend to converge over time. (See Appendix for price and quantity charts for each of the 19 commodities.)

Figure 3 shows a volume weighted price index for all 19 commodities (using February 4, 1992 quantity weights with December 1991 = 100 as a base period). Separate indexes were constructed for state-owned retail stores ("state price") and the collective-farm markets ("market price"). Market price data do not begin until the last week in January. The state-store price index rose sharply between December 1991 and January 1992, but not to the level of private market prices. Both indexes appear to have overshot the deregulated equilibrium, so that the indexes fell in February. Subsequently, both

indexes rose steadily through 1992, with some convergence of the two toward a common level in the summer. It is notable that the second steps of deregulation, in March 1992, had only a small apparent impact on food prices in general, although the impact on affected commodities was greater.

Table 1 compares the state-store price rise across commodities in two stages: the change in state-store prices between December 1991 and February 4, 1992, and the changes between February 4, 1992 and August 25, 1992. For example, the index value of 863 for beef in state stores on August 25, 1992 means the all-Russia average price of beef was 8.63 times the December 1991 price. The private market price changes are not shown because the December 1991 base is not available.

The right-hand column of Table 1 shows indexes of prices on August 25, 1992, with February 4 = 100. The value for beef of 133 means prices were 33 percent above February. The first and third columns show the initial shock effect of deregulation as compared to the effect of inflation over the following seven months. (Note that multiplying the first and third columns and dividing by 100 gives the second column. Thus, the first and third columns decompose the total price rise into two multiplicative components). The initial shock is larger for the overall average, and for most commodities. But some products had a smaller initial price rise than the subsequent (February through August) increases: vegetable oil, milk, sugar, potatoes, cabbage, and onions. For vegetable oil, milk, and sugar, the larger February through August price rise reflects removal of price ceilings retained until March 1992. For milk and sugar, a fall in volume prior to March was reversed, at least temporarily, after the removal of ceilings.

To determine relative prices for a particular commodity, compare the commodity's price index with the all-commodity price index. For the whole period, the lowest price increases were for millet groats, onions, cabbage, apples, and beef. Seasonal factors may account for cabbage and onions, which were presumably being harvested by the end of August. The commodities whose prices rose most were sugar, bread, vermicelli, and cigarettes.

Table 1. Price indexes, state-owned stores.

	December 1991 = 100		February 4, 1992 = 100
Commodity	February 4, 1992	August 25, 1992	August 25, 1992
Beef	651	863	133
Sausage 1	908	1730	191
Sausage 2	735	1249	170
Butter	774	1703	220
Vegetable oil	366	1555	425
Milk	315	1690	536
Sour cream	997	1505	151
Cheese	1620	3175	196
Eggs	824	1360	165
Sugar	473	3221	681
Bread 1	605	3146	520
Bread 2	410	2034	496
Millet groats	78	195	250
Vermicelli	1350	2997	222
Potatoes	269	1264	470
Cabbage	245	715	292
Onions	210	502	239
Apples	362	554	153
Cigarettes	500	2220	444
All 19	501	1563	312

Relative price changes have been very large. Between December 1991 and August 1992 the price of (high quality) bread relative to the price of beef more than tripled. The price of high quality bread relative to apples rose by a factor of almost six. These changes in relative prices reflect in part easing of mandated distortions embodied in the old administered prices. Movements in relative prices in the period immediately following liberalization are not fully explained in the current framework.

Price Differences Between Cities

In an economy with well-functioning, integrated markets, prices for the same commodity would differ between cities only by the cost of transporting the product. The size of price differences between cities provide information about how Russia's food marketing system coped with the economic shocks resulting from deregulation. In December 1991, prices in state stores already varied considerably from city to city. For example, the reported price of potatoes varied from a low of 0.33 rubles in Kizel to 4.00 rubles in Yuzhno-Sakhalinsk, and the volume-weighted standard deviation of the price of potatoes across cities was 1.05 rubles.

The coefficient of variation, the standard deviation divided by the mean, is a useful indicator of price differences from city to city because it self-adjusts for inflation. For potatoes in December 1991, the 132-city mean price was 1.89 rubles, so the coefficient of variation is 1.05/1.89 = .56.

A coefficient of variation declining over time indicates that price differences across cities are becoming relatively smaller. Table 2 indicates how the coefficient of variation changed during 1992 for each of the 19 commodities. All the coefficients of variation are less in February 1992 than before deregulation in December 1991. While commodity prices rose dramatically, by 500 percent on average (see Table 1), this rise was not a constant percentage across cities. It appears to have been closer to a constant increase in the ruble price. For this initial price shock, the city-to-city standard deviation of price may be a more meaningful measure. This measure is shown in Table 3.

Table 2. Coefficients of variation (x100) of commodity prices from city to city in state stores.

Date	Beef	Sausage 1	Sausage 2	Butter	Vegetable oil	Milk	Sour cream	Cheese	Eggs
12/91	64	73	89	61	89	76	88	133	90
01/21	27	17	16	65	52	161	45	54	6
01/28	36	23	30	31	77	88	49	53	30
02/04	20	21	20	47	66	69	29	55	20
02/11	19	25	18	54	84	58	31	54	46
02/18	20	19	19	58	60	73	30	47	23
02/25	21	24	21	58	68	72	31	48	19
03/17	16	21	23	52	69	71	35	28	17
03/31	19	23	20	40	74	74	31	35	23
04/07	17	23	21	26	59	64	37	20	24
04/14	19	23	21	27	65	64	35	20	25
04/21	16	23	19	26	55	64	36	23	24
04/28	14	22	22	30	52	61	36	25	25
05/05	16	22	25	21	56	67	33	24	23
05/12	16	22	24	19	63	62	35	21	23
05/19	17	24	22	21	51	61	36	25	25
06/02	18	22	22	20	48	66	30	20	25
06/09	23	23	27	19	48	49	32	20	22
06/16	22	20	19	20	50	44	32	17	24
06/23	22	19	18	21	45	42	33	17	25
06/30	19	20	19	19	42	40	33	17	25
07/07	18	18	19	18	38	39	34	17	28
07/14	20	18	20	18	47	36	33	17	24
07/21	18	18	18	18	40	37	34	16	27
07/28	20	17	21	18	38	37	33	17	26
08/04	17	19	20	16	37	36	32	14	24
08/11	22	19	20	14	38	33	30	16	20
08/18	23	18	26	14	39	33	30	17	22
08/25	22	19	22	14	40	34	29	18	24

Table 2. Coefficients of variation (x100) of commodity prices from city to city in state stores (cont.)

sugar	bread 1	bread 2	millet groats	vermicelli	potatoes	cabbage	onions	apples	cigarettes
86	43	77	--	63	56	53	48	68	96
63	8	40	56	62	46	55	37	23	8
62	18	19	55	41	51	63	42	30	63
45	17	18	41	44	38	40	38	44	57
73	28	21	58	41	32	36	37	37	58
104	45	23	52	38	41	40	39	31	42
100	47	43	51	38	42	62	41	38	53
101	44	46	57	31	32	58	45	39	48
88	47	51	49	27	39	62	39	41	35
87	57	56	45	26	36	56	42	37	40
92	55	51	48	30	47	64	39	37	41
70	54	50	45	34	43	49	29	33	41
68	57	54	46	33	43	41	26	40	26
69	62	50	45	26	44	48	27	42	35
64	59	51	40	27	43	49	33	49	31
58	61	56	45	29	41	43	27	48	31
52	61	59	45	31	39	25	43	38	33
45	52	55	47	33	38	24	38	39	2[illegible]
47	54	52	40	30	40	23	41	27	34
48	49	48	36	31	39	25	34	35	26
52	55	53	37	33	41	31	32	29	30
48	52	51	36	32	42	30	32	40	29
47	49	49	52	29	54	37	29	26	25
46	40	41	45	27	47	52	30	52	18
43	40	44	42	32	36	60	44	58	23
39	36	41	43	30	34	43	39	44	18
32	38	40	41	29	37	47	71	56	25
35	37	40	51	27	43	49	71	53	28
33	35	39	49	25	38	52	67	60	35

Table 3. Standard deviation of commodity prices from city to city at selected dates in state stores.

Product	December 1991	February 4, 1992	May 12, 1992	August 25, 1992
	rubles per unit			
Beef	5.41	13.33	10.56	19.11
Sausage 1	6.85	14.53	20.87	25.92
Sausage 2	19.92	22.69	31.34	43.07
Butter	6.08	39.90	32.12	27.06
Vegetable oil	3.63	8.10	23.46	21.09
Milk	0.49	1.29	3.59	3.26
Sour cream	3.71	10.70	16.70	15.88
Cheese	7.59	41.57	28.93	27.08
Eggs	2.60	2.97	5.31	5.92
Sugar	1.22	3.71	26.18	18.72
Bread 1	0.22	0.34	2.57	3.46
Bread 2	0.46	0.45	2.42	4.76
Millet groats	–	1.66	3.03	4.97
Vermicelli	0.93	5.95	4.96	7.47
Potatoes	1.05	1.52	2.81	7.48
Cabbage	1.05	1.79	5.28	6.76
Onions	2.38	3.57	4.12	14.78
Apples	4.80	10.50	22.70	22.23
Cigarettes	1.86	2.78	3.71	7.70

Table 4. Coefficients of variation of commodity prices from city to city at selected dates in private markets.

Product	February 4, 1992	May 12, 1992	August 25, 1992
Beef	0.53	0.34	0.30
Butter	0.20	0.18	0.11
Vegetable oil	0.62	0.41	0.45
Milk	0.62	0.41	0.45
Sour cream	0.35	0.32	0.30
Eggs	0.21	0.26	0.26
Potatoes	0.37	0.44	0.48
Cabbage	0.35	0.32	0.65
Onions	0.33	0.31	0.50
Apples	0.24	0.26	0.75
Cigarettes	0.25	0.13	0.24

For purposes of obtaining an indication of improved market integration during 1992, changes in the coefficient of variation between February and August provide the best measure. The Table 2 data indicate little of such integration for some commodities, while the coefficient of variation declined substantially for cheese, butter, vermicelli, vegetable oil, milk, sour cream, sugar, and cigarettes.

Table 4 provides similar comparisons for prices in collective farm markets. Here we see more of the expected trend toward market integration, particularly for beef, but there is still a lack of convergence for some commodities.

Causes of City-to-City Price Differences

In order to investigate the causes of persistent price differences between cities, we can attempt to explain statistically each city's deviation from the all-Russia average at a given time by means of supply/demand variables. The Center for Economic Analysis and Forecasting provided data on:

- Income per worker in each month of 1992 in each province
- Whether each province was a net producer or consumer of each commodity
- The pricing zone in prior USSR administration (proxy for transport costs)
- Presence or absence of provincial price regulation after January 1992

These data were used to estimate the following linear regression equation for each commodity:

(1)
$$D_{it} = \beta_0 + \beta_1 Y_{it} + \beta_2 E_i + \beta_3 I_i + \beta_4 R_{it} + \beta_5 Z_i + \varepsilon_{it}$$

where D_{it} is the difference between city i's price and the all-Russia price in week t, Y_{it} is income in the province of city i in the month containing week t, $E_i = 1$ if the province produced more of the commodity than it consumed (otherwise zero), $I_i = 1$ if the province consumed more of the commodity than it produced, and $R_{it} = 1$ if the city maintained regulation in week t. Z_i is a vector of 3 dummy variables—$Z_1 = 1$ if the province is in zone 1, $Z_2 = 1$ if in zone 2, $Z_3 = 1$ if in zone 3. The β's are parameters to be estimated and the ϵ_{it} are random errors assumed to be independently and identically

distributed. The Z_i, E_i and I_i are not linear combinations of the intercept term because some provinces are classified as being neither an exporter nor an importer, and some cities are not in any of the 3 zones.

The results of fitting this equation to the February-August price data for each of the 19 commodities are shown in Table 5. Generally, only a small part of the cities' state-store price deviations from the all-Russia price can be explained by these regressions. The R^2 (adjusted for degrees of freedom) range from .051 (cigarettes) to .320 (milk).

Of the variables intended to explain the price differences, income is most in accord with expectations. Higher income in a city causes higher prices, i.e., increased demand, for every commodity except potatoes and milk. The largest percentage effect is in vegetable oil where a 100 ruble (2.5 percent) income increase is associated with a 0.32 ruble (.7 percent) price increase. The next biggest effect is in butter, where a 100 ruble income increase raises the butter price .53 rubles (.3 percent).

The other variables have only sporadic and quantitatively small effects with only a few exceptions. The ruble effects are easy to interpret since the variables other than income are all 0-1 dummies. Thus, the estimated effect on beef prices of being in a regulated province is a 3.9 ruble (20 percent) reduction in excess of price over average price. Being in a net exporting region reduces the prices of vegetable oil, milk, sugar, vermicelli, potatoes, cabbage, and cigarettes significantly.

Table 6 shows regression results for collective farm markets. There are fewer commodities because several had few observations (less than 200) with sporadic and extreme prices. The results are quite similar to the state-store regressions, but with higher explained variation of prices. The R^2 ranged from .12 (sour cream) to .51 (vegetable oil).

Since the variables of these regressions explain relatively little, the regressions cannot go far in explaining the rate of market integration in Russia. Even after accounting for differences in income, reported local regulation and other important economic variables, about 80 percent of the price deviation among cities remains unexplained. The residuals from these regressions may throw light on the process

Table 5. Regression coefficients ("t" ratios) explaining city price deviations from all-Russia prices: state stores

Variable	Commodities								
	Beef	Sausage I	Sausage II	Butter	Vegetable Oil	Milk	Sour Cream	Cheese	Eggs
Intercept	-5.88	-13.13	-37.96	89.87	7.72	1.17	-11.74	-10.41	-1.03
	(4.27)	(6.59)	(13.19)	(28.87)	(2.45)	(5.36)	(9.995)	(4.11)	(2.57)
Income	1.8	1.5	4.9	5.3	3.2	-0.1	1.5	0.023	0.73
	(9.28)	(4.57)	(11.27)	(10.86)	(12.14)	(3.06)	(8.39)	(0.047)	(11.61)
Regulation	-3.89	4.31	-1.35	-28.79	-3.56	-0.97	-7.24	-18.77	-1.42
	(3.22)	(2.44)	(0.56)	(9.26)	(2.08)	(4.58)	(6.3)	(6.41)	(3.75)
Import	4.53	14.15	26.93	13.24	-1.38	0.084	10.99	21.56	1.004
	(5.09)	(10.74)	(14.78)	(6.7)	(0.53)	(0.61)	(14.56)	(12.28)	(3.58)
Export	-0.86	-1.16	8.68	1.23	-19.27	-0.49	4.17	2.51	0.023
	(1.03)	(0.93)	(5.07)	(0.64)	(6.76)	(3.65)	(5.77)	(1.53)	(0.097)
Zone 1	0.6	2.99	5.5	12.52	-8.3	-1.72	-0.25	-4.56	-2.48
	(0.52)	(1.86)	(2.26)	(4.41)	(5.2)	(8.73)	(0.231)	(2.08)	(6.75)
Zone 2	7.98	4.26	18.9	19.08	-2.9	1.09	6.49	7.34	1.36
	(6.64)	(2.56)	(7.59)	(6.56)	(1.67)	(5.39)	(5.93)	(3.24)	(3.46)
Zone 3	5.48	7.79	17.38	18.07	-9.44	5.02	5.92	12.29	2.59
	(3.42)	(3.34)	(5.05)	(4.46)	(4.32)	(18.17)	(3.9)	(3.544)	(5.01)
R-Square	0.18	0.15	0.27	0.13	0.233	0.32	0.2	0.178	0.1987
Obs.	2636	2890	2850	3403	2533	3435	3300	2386	3328

Table 5. Regression coefficients ("t" ratios) explaining city price deviations from all-Russia prices: state stores (cont.)

Variable	Commodities									
	Sugar	Bread I	Bread II	Noodles	Vermicelli	Potatoes	Cabbage	Onions	Apples	Cigarettes
Intercept	17.47 (3.62)	0.776 (2.643)	0.29 (1.14)	-0.745 (1.25)	0.024 (0.038)	-4.16 (9.746)	-5.43 (8.758)	-4.98 (7.74)	-18.495 (6.411)	-0.612 (0.942)
Income	0.96 (2.95)	0.17 (3.34)	0.07 (1.441)	0.48 (5.46)	0.48 (4.572)	1 (13.988)	1.4 (14.04)	1.4 (13.415)	4.1 (13.511)	0.37 (4.723)
Regulation	-7.61 (3.52)	-0.12 (0.445)	0.178 (0.62)	-1.86 (3.724)	-2.99 (4.426)	-0.68 (1.888)	0.555 (0.791)	1.64 (2.796)	3.66 (1.972)	-1.34 (2.325)
Import	-9.05 (1.97)	--	--	0.756 (1.653)	-0.073 (0.189)	1.46 (6.375)	1.475 (3.943)	0.462 (1.166)	9.33 (4.226)	0.3 (0.544)
Export	-32.72 (6.93)	--	--	-0.455 (1.014)	-3.015 (7.034)	-0.705 (2.861)	0.792 (1.841)	-0.073 (0.153)	-3.3 (1.329)	-1.61 (2.505)
Zone 1	0.13 (0.061)	-2.42 (8.401)	-2.3 (9.16)	-1.28 (3.071)	-3.062 (5.153)	0.815 (2.166)	0.471 (0.843)	-0.26 (0.485)	-2.67 (1.397)	0.83 (1.676)
Zone 2	8.89 (4.22)	-0.84 (2.888)	0.684 (2.62)	0.046 (0.113)	2.87 (4.764)	2.26 (5.908)	3.64 (6.198)	2.71 (4.73)	5.846 (2.976)	1.55 (3.008)
Zone 3	-6.84 (2.42)	0.874 (2.595)	0.395 (0.897)	1.61 (2.774)	-1.06 (1.253)	2.12 (4.186)	3.02 (4.008)	5.47 (7.258)	7.465 (2.779)	1.776 (2.662)
R-Square	0.166	0.154	0.164	0.137	0.1482	0.1513	0.1719	0.1507	0.2456	0.0509
Obs.	2490	1715	2443	1372	2722	2703	2445	2828	1772	1707

Table 6. Regression coefficients ("t" ratios) explaining city price deviations from all-Russia prices: collective farm markets

Variable	Bread	Butter	Vegetable Oil	Milk	Sour Cream	Eggs	Potatoes	Cabbage	Onions	Apples
Intercept	-6.16	81.86	17.66	3.91	-2.69	4.1	-4.68	-6.37	-8.37	-22.56
	(2.5650	(19.455)	(3.058)	(5.46)	(0.728)	(4.665)	(7.347)	(7.604)	(8.815)	(6.619)
Income	5.1	0.528	4.1	0.77	3.4	1.2	1.1	3.1	3.6	7.6
	(11.277)	(0.554)	(8.285)	(6.115)	(4.982)	(6.544)	(10.184)	(17.325)	(19.72)	(16.483)
Regulation	8.19	-20.19	21.5	0.13	-9.54	-0.66	1.22	2.77	3.78	4.004
	(3.441)	(3.919)	(7.895)	(0.179)	(2.238)	(0.589)	(1.897)	(2.632)	(4.097)	(1.486)
Import	17.17	21.97	21.5	0.13	-9.54	-0.66	3.1	2.55	0.73	9.82
	(10.952)	(3.919)	(7.895)	(0.179)	(2.238)	(0.589)	(8.297)	(4.394)	(1.207)	(3.958)
Export	-1.54	-5.49	-22.13	0.69	1.31	-2.73	-1.7	-1.25	1-.36	5.36
	(1.029)	(2.747)	(4.057)	(1.808)	(0.61)	(5.965)	(4.2)	(2.064)	(1.996)	(1.867)
Zone 1	-19.3	-18.27	-20.73	-8.67	-17.83	-6.54	-0.92	-1.93	-1.46	-7.007
	(10.244)	(5.075)	(10.951)	(12.441)	(5.107)	(9.06)	(1.645)	(2.452)	(1.78)	(2.886)
Zone 2	-13.29	-15.46	-17.23	-6.1	-12.73	-2.76	1.6	2.17	0.67	12.83
	(6.727)	(3.917)	(7.91)	(8.784)	(3.651)	(3.353)	(2.807)	(2.696)	(0.812)	(5.154)
Zone 3	-13.11	-43.43	3.88	--	-46.4	-14.38	4.25	-4.56	-2.42	13.8
	(2.849)	(1.871)	(1.48)		(2.614)	(4.814)	(4.691)	(2.353)	(1.439)	(3.558)
R-Square	0.2487	0.145	0.5055	0.2386	0.1201	0.1603	0.1678	0.2854	0.1978	0.2305
Obs.	2557	1302	1264	1825	1977	16781	2764	1758	2266	2593

in two ways: first, in exploring how city-to-city food price differences change over time for different commodities; and second, whether certain cities are persistently high or low in price compared to the all-Russia average.

Trends in residual food price variation

The relative residual differences between a city's price and the all-Russia mean price are used to fit the following equation for each commodity:

(2) $$|\epsilon_t^*| = \alpha_1 + \alpha_2 t + v_t$$

where t is measured as days since January 1, 1992. The relative residual, ϵ_t^*, is defined as

(3) $$\epsilon_t^* = \hat{e}_t / \bar{P}_t$$

where $\hat{e}_t$ is the estimated residual from equation (1) and $\bar{P}_t$ is the mean price of the commodity at time t. The dependent variable is put in relative terms to adjust for inflation.

One might expect that the markets would take time to adjust to the city-to-city price differences that emerged when food prices were deregulated in January, so that the unexplained price differences would be less, the later in 1992. This would cause $\alpha_2 < 0$ in equation (2).

The results of the regressions are shown in Table 7. All the commodities but four (millet groats, potatoes, onions, and apples) show a significant reduction in the residuals over time. Potatoes, onions, and apples have increased city-to-city price differences in August, apparently as new crops became available in some areas (see Table 2). Before August, residual city-to-city price variation was declining for these commodities, too. So we do see quite pervasive evidence of market integration.

The coefficients indicate, however, fairly slow elimination of city-to-city differences. The coefficient for beef implies that by the end of August (t = 240), the average city's residual price difference from the all-Russia mean beef price was reduced by only 3.8 percent of the mean price as compared to January price differences. This is about one-fifth of the average unexplained price differences; that is, it would take about 2½ years to eliminate the cities' price differences that are not

Table 7. Estimated reduction in residual price differences in state stores over time.*

Commodity	$\hat{\alpha}_2$	"t" statistic	R^2
Beef	-.016	(3.6)	.005
Sausage I	-.033	(7.4)	.018
Sausage II	-.021	(4.9)	.008
Butter	-.389	(23.6)	.140
Vegetable Oil	-.267	(19.5)	.131
Milk	-.338	(25.9)	.164
Sour Cream	-.017	(2.9)	.002
Cheese	-.138	(21.2)	.159
Eggs	-.013	(2.8)	.002
Sugar	-.63	(38.7)	.376
Bread I	-.147	(10.9)	.065
Bread II	-.133	(14.5)	.079
Millet groats	.006	(0.4)	.000
Vermicelli	-.093	(10.4)	.038
Potatoes	.029	(2.9)	.003
Cabbage	-.101	(6.1)	.015
Onions	-.006	(0.7)	.000
Apples	.004	(0.3)	.000
Cigarettes	-.162	(12.6)	.085

* Estimate of α_2 in equation 2. t ratios in parentheses.

explainable by the variables of equation (1). This is about the average rate of market integration for these 19 commodities.

A first step in understanding why market integration has not occurred as rapidly as one would have hoped is to examine further the characteristics of cities whose prices have remained most persistently low or high relative to all-Russia average prices.

Prices were surveyed in 28 weeks of 1992 for 19 commodities. If a city had prices whose residual (after equation 1) excess over the all-Russia price for a commodity is in the lower 10 percent of all the cities for more than 100 of the ($28 \times 19 =$) 532 observations (19 weeks), then we call this city persistently low-priced. Persistently high-priced cities are defined analogously.

Table 8 summarizes the results of applying these definitions. Special circumstances apply in both the high- and low-priced cities. For example, low-priced cities may be company towns dominated by a large industrial enterprise that provides cheap food, or the city may be an administrative center of an autonomous republic that maintains food pricing policy different from federal policy. The high-priced cities tend to be in the Far East, plus Moscow and St. Petersburg.

Regional Market Integration

Because the prices that are furthest from what one would expect are in cities in extreme locations and special industrial situations, the all-Russia regressions and residuals may well mask more complete economic integration within areas that are large, but not so vast as the whole of Russia.

We focus on four regions, omitting the most northern and eastern parts of the country. The regions, and cities surveyed in each, are shown in Table 9. The regions have 14 to 18 cities sampled, and cover areas of roughly 400 by 400 miles (Central), 400 by 600 miles (North Caucasus), 300 by 900 miles (Volga), and 400 by 750 miles (Urals); that is, they are roughly the size of 2 or 3 U.S. Midwestern states, or in the case of the Volga region, the lower Mississippi basin from St. Louis to New Orleans.

Table 8. Persistently low- and high-priced cities.

Low-priced cities		observations in lower 10% of residuals		
city name	city code	total	state stores	market
Noril'sk	11044294	177	175	2
Arzamas	11224033	146	88	58
Ulyanovsk	11734018	140	124	16
Ukhta	11874251	135	103	32
Izhevsk	11944017	128	85	43
Cherkessk	11914016	125	37	88
Kazan'	11924012	124	113	11
Taishet	11254287	118	55	63
Syktyvkar	11874015	114	93	21
Smolensk	11664016	112	84	28
Yoshkar-Ola	11884019	112	82	30
Shuia	11244113	111	58	53
Vladivostok	11054016	106	32	74
Angarsk	11254057	106	85	21
Abakan	11954010	105	35	70
Maikop	11794011	103	35	68
Tula	11704017	101	74	27
High-priced cities		**observations in upper 10% of residuals**		
Petropavlovsk - Kamchatskii	11304016	289	145	144
Yuzhno - Sakhalinsk	11644019	228	161	67
Magadan	11444013	193	147	46
St. Petersburg	1140	160	58	102
Moscow	1145	138	26	112
Novorossisk	11034203	134	49	85
Kaliningrad	11274019	130	61	69
Yakutsk	11984011	128	97	31
Vorkuta	11874104	125	90	35
Kemerovo	11324013	108	101	7
Tomsk	11694017	106	89	17
Novosibirsk	11504011	103	76	27
Khabarovsk	11084017	102	49	53

Table 9. Cities in regions for tests of market integration.

Central Region	Volga Region	North Caucasus Region	Urals Region
Briansk	Elista	Maikop	Ufa
Vladimir	Kazan'	Makhachkala	Ishimbai
Ivonovo	Naberezhnye Chelny	Nal'chik	Neftekamsk
Schuya	Chistopol'	Cherkessk	Sterlitamak
Kaluga	Astrakhan'	Vladikavkaz	Izhevsk
Obninsk	Penza	Groznyi	Kurgan
Kostroma	Volgograd	Krasnodar	Orenburg
Moscow	Kamyshin	Armavir	Omsk
Orekhova	Samara	Novorossisk	Perm'
Electrostal'	Syzran'	Tuapse	Ekaterinburg
Orel	Tol'iatti	Stavropol'	Nizhnii-Tagil
Riazan'	Saratov	Nevinnomysok	Serov
Smolensk	Balakovo	Rostov-on-Don	Cheliabinsk
Tver'	Ul'ianovsk	Taganrog	Kopeisk
Tula		Shakhty	Miass
Novomoskovsk			
Yaroslavl'			
Rybinsk			

Table 10. All Russia compared to regional prices, state stores.

Sugar	February 11, 1992	August 25, 1992	% change
All-Russia			
mean price (rubles)	rub. 12.6	rub. 55.7	342
std. dev. (rubles)	rub. 13.1	rub. 18.7	43
coef. var.	1.04	.33	-68
Central Region			
mean price (rubles)	8.3	66.8	704
std. dev. (rubles)	5.7	8.9	56
coef. var.	.69	.13	-81
Volga			
mean price (rubles)	9.5	41.6	338
std. dev. (rubles)	13.8	15.0	9
coef. var.	.81	.29	-64
Urals			
mean price (rubles)	23.2	57.5	148
std. dev. (rubles)	16.6	18.3	10
coef. var.	.71	.32	-55

Table 11. Regional reduction in residual price differences over time*

Commodity	All Russia (132 cities)	Central Region (18 cities)	Volga Region (14 cities)	North Caucasus (15 cities)	Urals Region (15 cities)
beef	-.016	-.016	.002	-.031	-.018
sausage 1	-.033	-.019	-.030	-.060	-.041
sausage 2	-.021	-.022	-.021	-.071	.006
butter	-.389	-.244	-.023	-.112	-.099
vegetable oil	-.267	-.286	-.288	-.106	-.503
milk	-.338	-.405	-.326	-.476	-.352
sour cream	-.017	-.028	-.039	-.104	-.061
cheese	-.138	-.072	-.116	-.128	-.098
eggs	-.013	-.039	.026	-.026	-.023
sugar	-.637	-.780	-.452	-.493	-.639
bread 1	-.147	-.070	.164	.237	-.368
bread 2	-.133	-.038	.223	.068	-.300
millet groats	.006	-.048	.023	-.068	-.144
vermicelli	-.093	-.055	-.086	-.090	-.032
potatoes	.029	.041	-.009	.031	-.027
cabbage	-.101	-.120	-.025	.015	-.140
onions	-.006	-.073	-.059	-.025	.006
apples	.004	.024	.102	-.012	-.010
cigarettes	-.162	-.218	-.059	—	—

* The numbers shows are regression coefficients for the variable t(days) in equation 2 multiplied by 100. A larger negative coefficient indicates more rapid market integration.

Table 10 compares all-Russia with regional prices for sugar on two dates, one in February and the other in August 1992. The mean prices differ by region but the standard deviation of price within the North Caucasus and Urals region is greater than the standard deviation over the whole 132 cities of Russia. Much of the city-to-city price variation is within regions rather than between regional means. One might expect that regional integration would proceed more rapidly than national integration over the vast all-Russian market. Even at the regional level, however, barriers to emergence of markets appear to have been great in February through August 1992. However, the coefficient of variation of price within each region is smaller than the all-Russia C.V. Between February and August the coefficients of variation declined very substantially for each region, but not more than the all-Russia C.V. declined.

The results of more systematic testing of regional market integration are shown in Table 11. Regressions like those of Table 5 were estimated for each region, with the dependent variable being the difference between a city's price and the regional mean price at each date. A typical commodity regression now has 300-400 observations, e.g., 15 cities for 25 weeks, instead of 3000-3500 observations for the all Russia regressions.

The residuals from the regional regressions were then regressed on the number of days since Jan. 1, 1992, as in equation 2. The resulting estimates of α_2 are reported in Table 11. The first column repeats the all-Russia results from Table 7. (To save space, t ratios are omitted from Table 11; they are generally smaller than the all-Russia t ratios, but still significant). The row labelled "sugar" in Table 11 indicates the same results as Table 10. Significant market integration occurred, but on average the regions eliminated city-to-city price differences no more quickly than all of Russia did.

The results for the other 18 commodities tell the same story. Some regions had more market integration than all of Russia for certain commodities, but there is no indication that all or any regions had an outstanding performance generally.

Conclusions

The retail food price data by city indicate that significant progress toward market integration occurred in the seven months following the price liberalization of January 1992. A decline in cities' price deviations from the all-Russia mean price occurred for 17 of the 19 commodities analyzed.

Still, large differences between cities persist for which there is no explanation in terms of available economic variables. It is likely that this lack of apparent market integration is in part attributable to food pricing policies in some remote cities, or cities where dominant industries subsidize food. Beyond this, there must be significant barriers to the movement of products from low-price to high-price cities. To what extent these barriers are local policies preventing shipments out of low-price areas, lack of entrepreneurship among buyers or sellers within the distribution system, or other constraints or costs is not ascertainable from the data we have. Much of the remaining distortion of prices between and among localities can probably be attributed to the lag in initiating reforms at the enterprise level and in the transport system. Some may be attributable to economic agents' inability to keep up with changes in relative prices associated with the credit-induced general inflation.

It seems clear that large economic gains could be achieved by further market integration. The best evidence of this is from the price relationships between cities in the same region. For example, Ulianovsk on the Volga region had the largest volume of sugar sales (in monitored stores) in the Volga region, and the lowest price, at 25 rubles per kilo as of August 25. At the same time, the two nearest cities in our sample, Syzran' and Samara, 150 and 286 kilometers away, and both also on the Volga River, had prices of 62.5 rubles. Transportation costs in this situation could not have been more than a few rubles per kilo. The profit potential appears enormous, as do the potential welfare gains.[**]

[**] To obtain a crude approximation of potential welfare gains, Ulianovsk consumes 3000 kilos of sugar weekly at 25 rub./kg., Samara and Syzran' consume 1000 kilos at 62.5 rub./kg. Suppose sugar can be moved from Ulianovsk to these cities for 5 rub./kg. (20 percent of its price), and that all three cities have an elasticity of demand for sugar of -.5. Shipping about 300 kilos would equilibrate price at about 37 rub./kg. in Ulianovsk, and 32 rub./kg. in Samara and Syzran'. The gain from the shipment would average about 24 rub./kg., for a 19 rub./kg.

Data on the geographic dispersion of food prices in Russia in the eight months following price liberalization of January 1992 suggest the following:

a. The volume of food sold in monitored shops increased substantially in the weeks following liberalization;

b. The geographic dispersion of prices decreased significantly over time, suggesting some response of economic agents to the large price differences and opportunities for arbitrage;

c. More of the reduction in price dispersion took place in the period immediately following liberalization than in the subsequent six months;

d. Although price dispersion declined over time, the decline was slower than would be expected if well-developed markets were actually functioning;

e. Much (about two-thirds) of the remaining price distortion cannot be explained by traditional economic variables that we have, such as income and proxies for transportation cost.

Further development of food markets will require retention and deepening of price liberalization through removal of local controls and initiation of reform at the enterprise level, through privatization, demonopolization and new entry.

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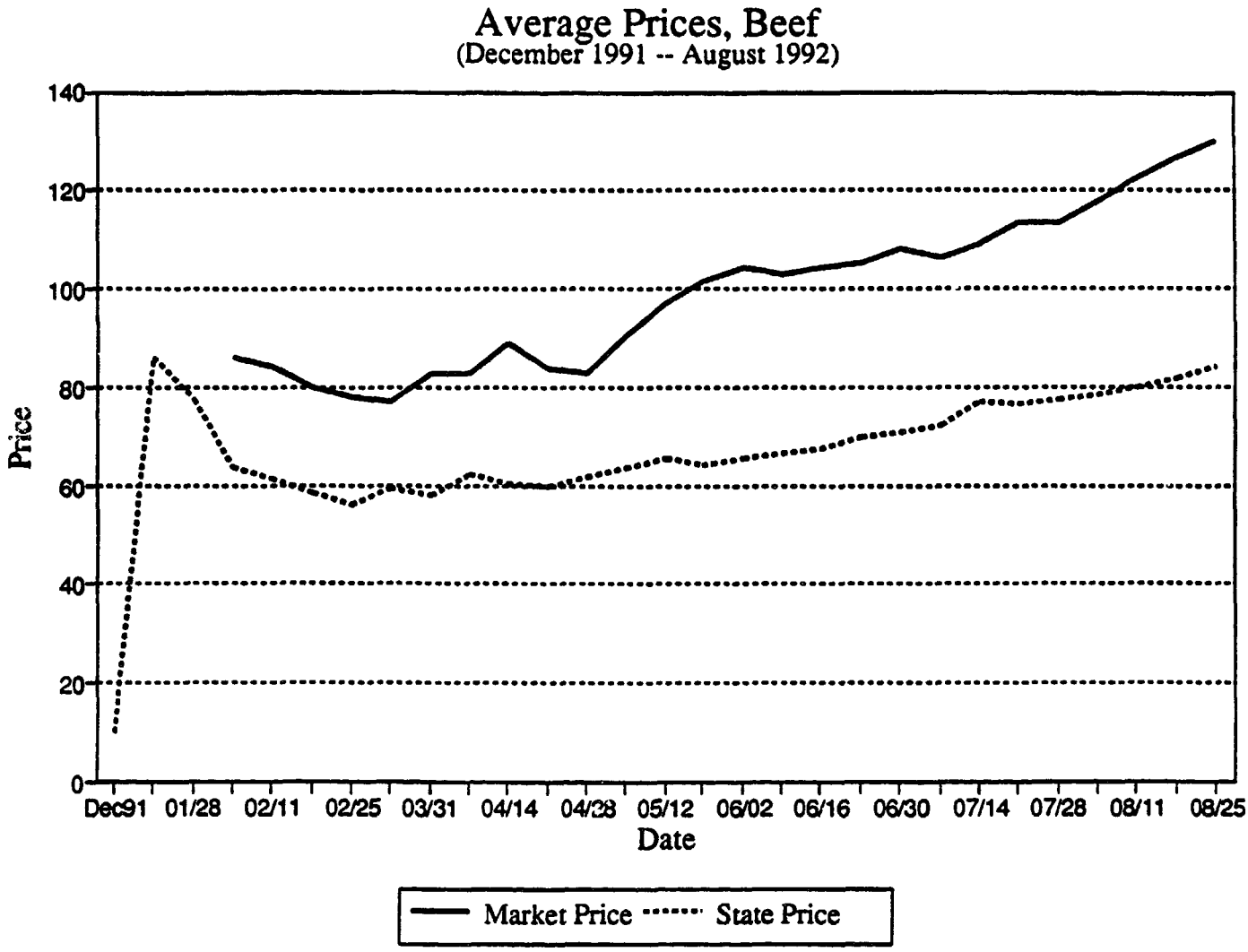
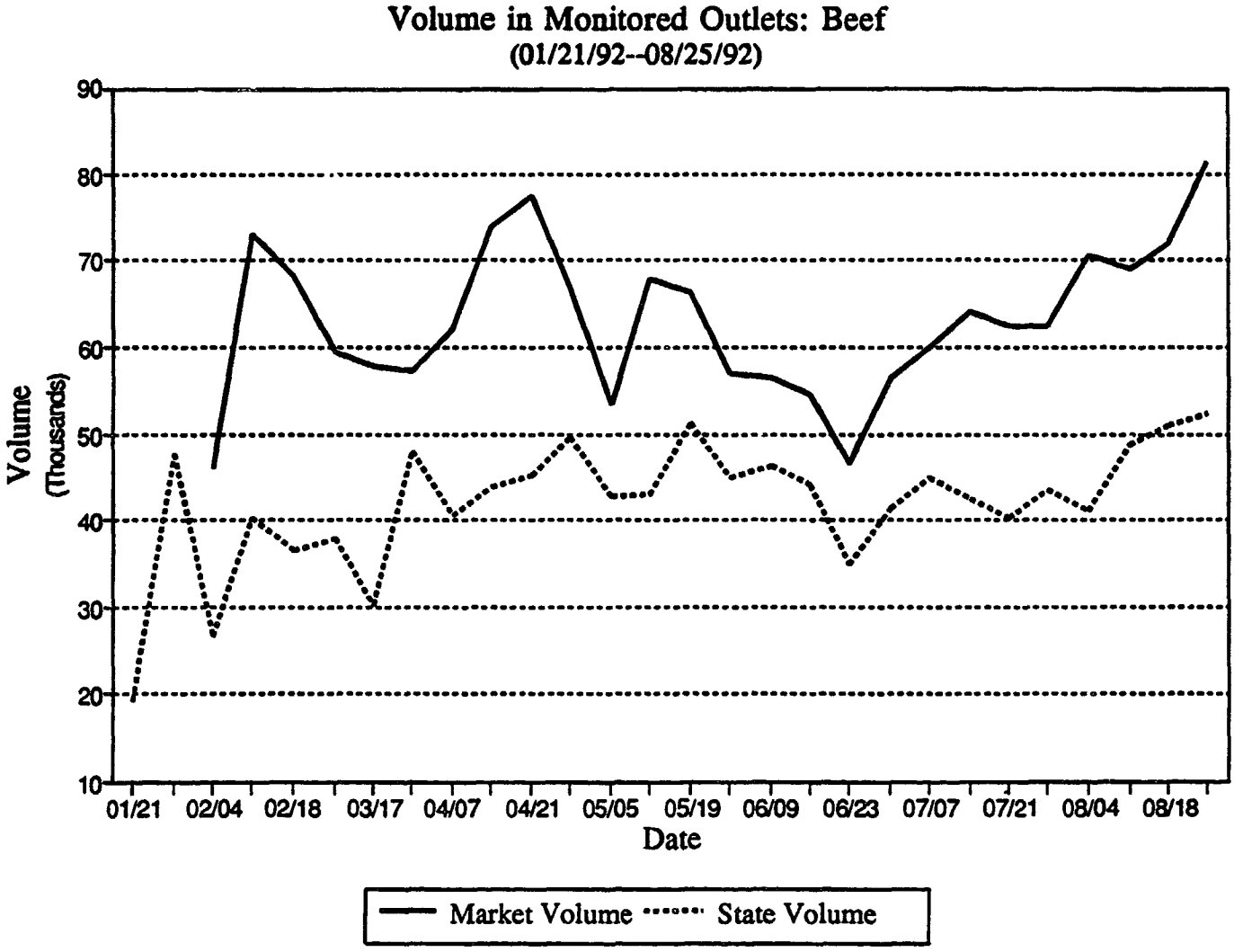
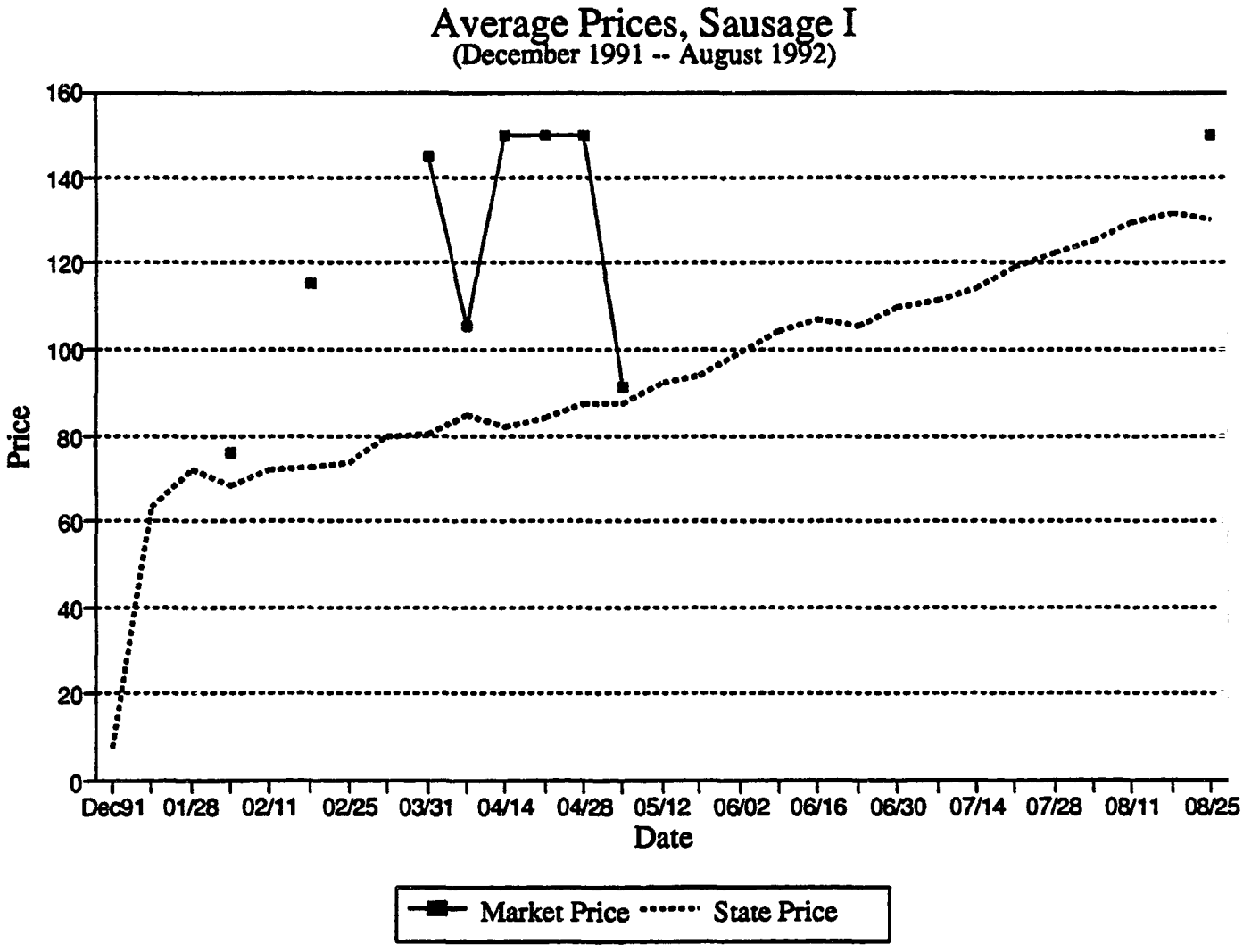
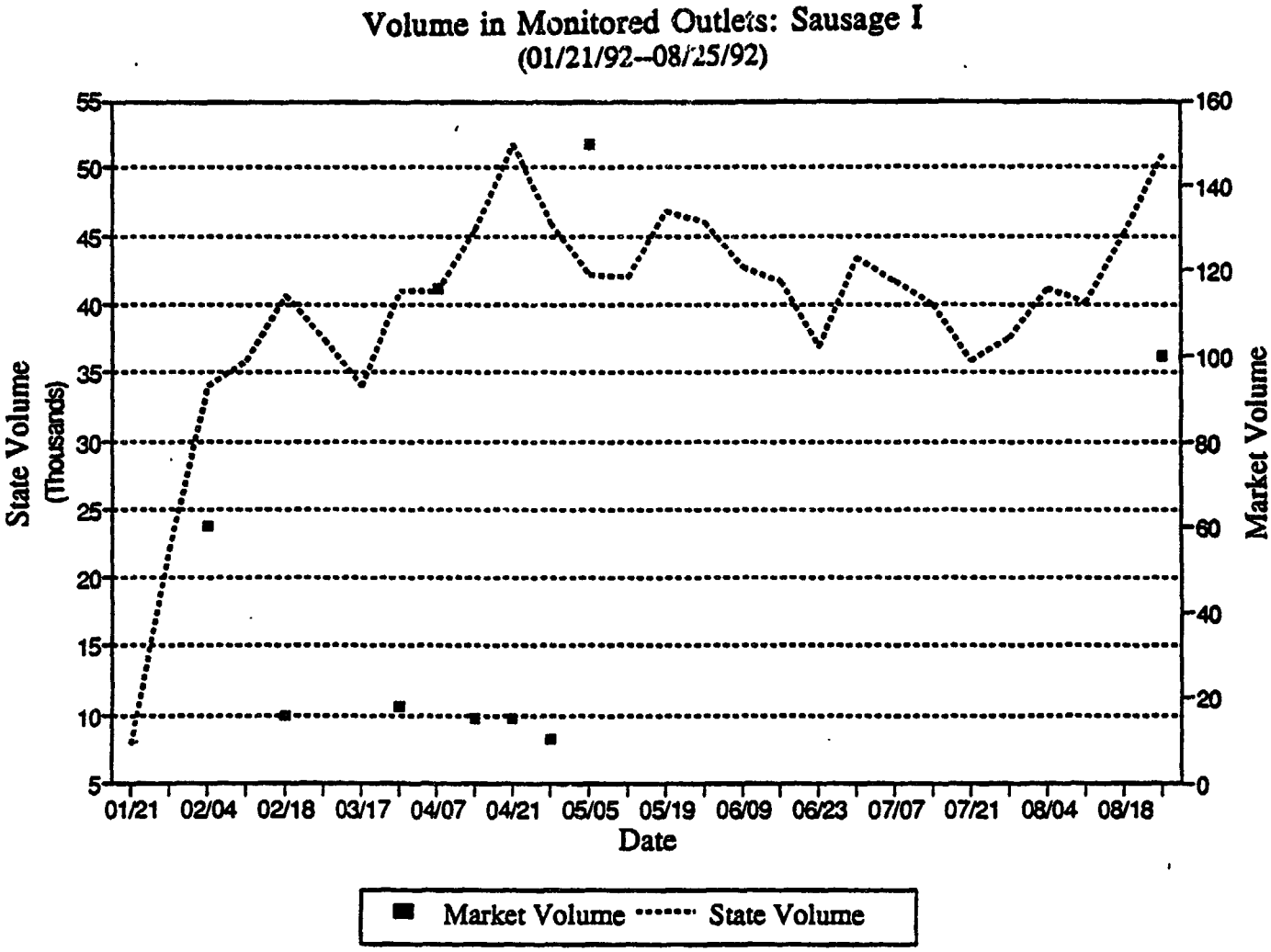
net profit. This amounts to 300 × 19 = 5700 rubles net profit on an investment of 300 × 5 = 1500 rubles.

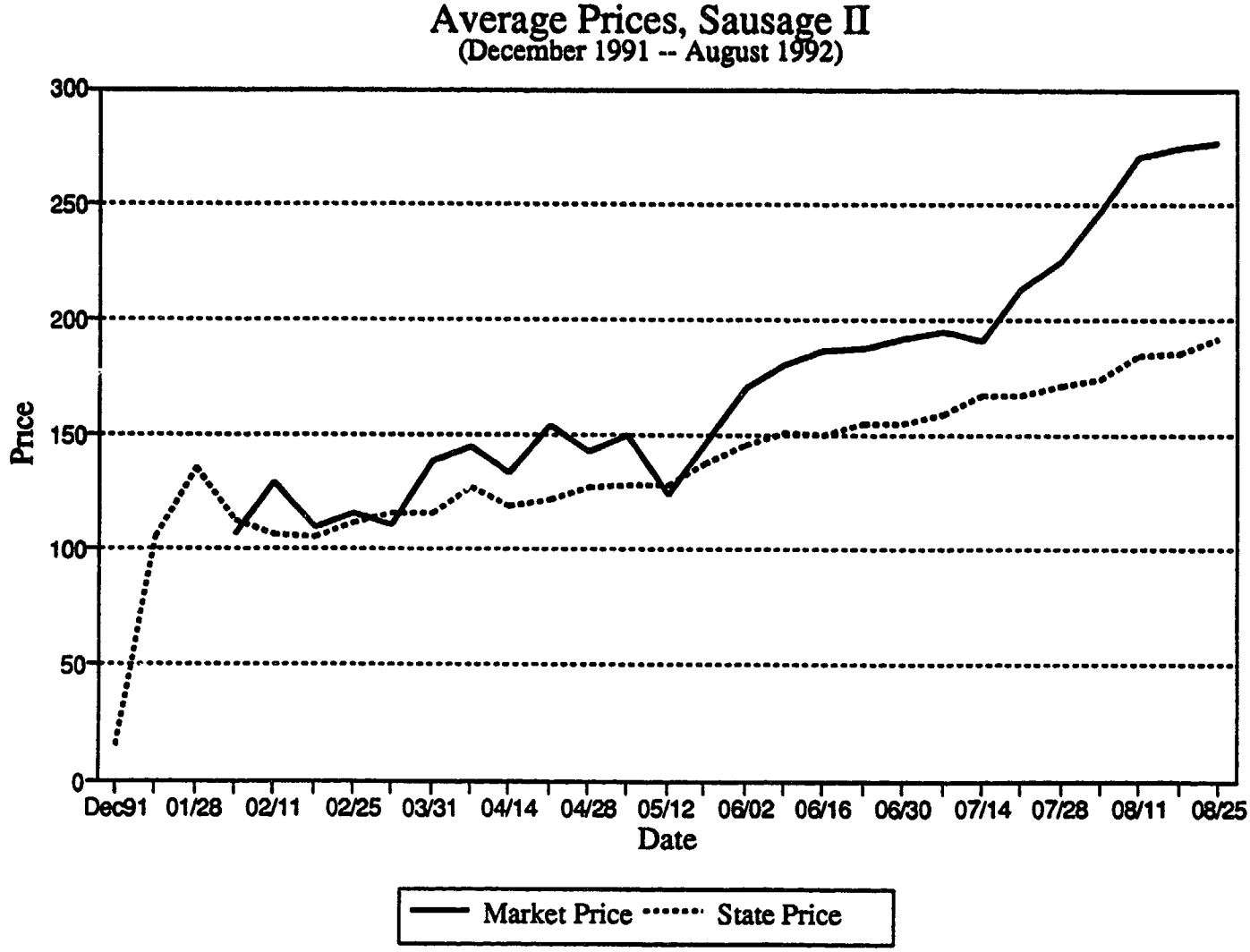
APPENDIX. Average Prices and Volume in Monitored Outlets of 19 Commodities in 132 Russian Cities.



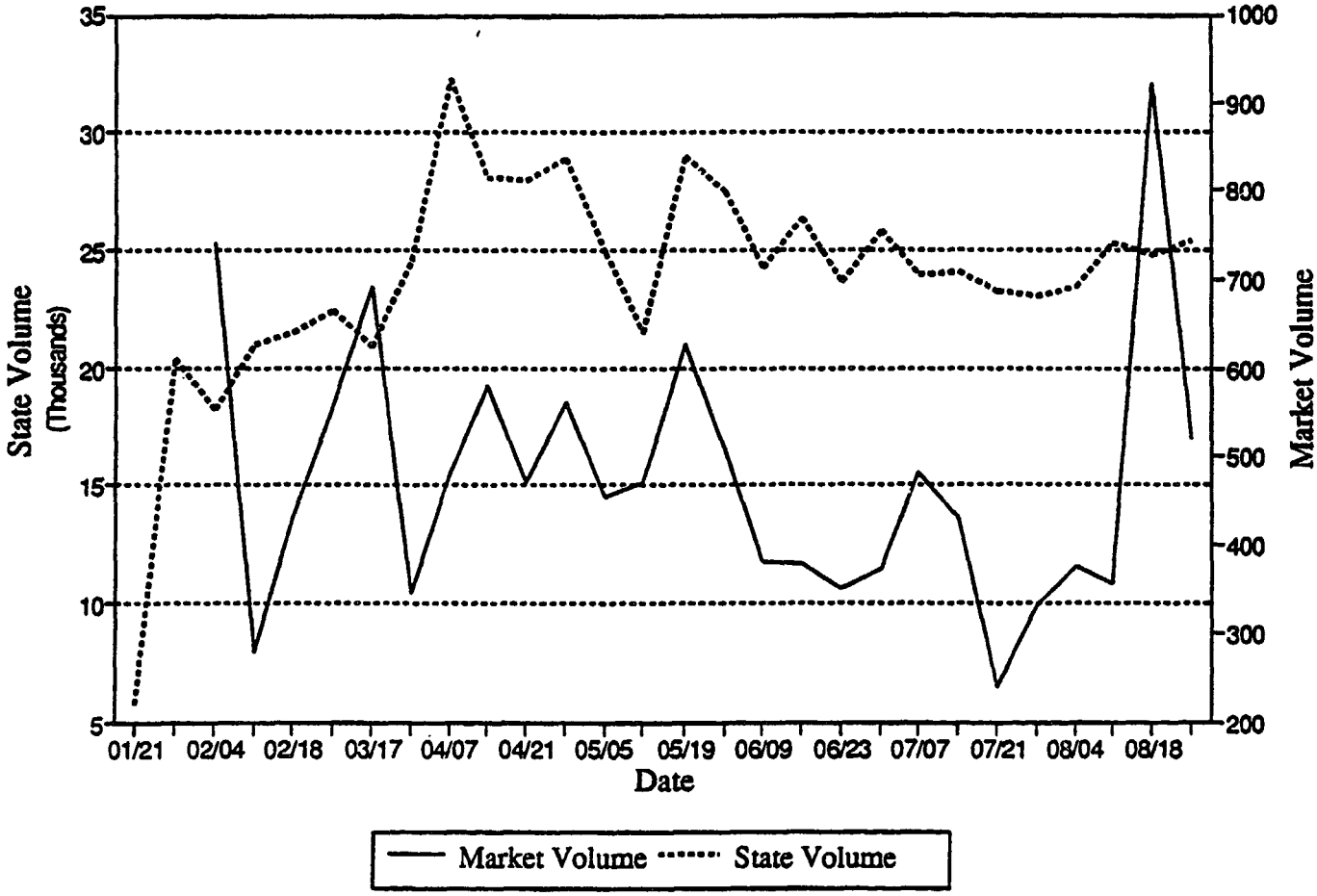

Volume in Monitored Outlets: Beef
(01/21/92--08/25/92)
Volume
(Thousands)
90
80
70
60
50
40
30
20
10
01/21
02/04
02/18
03/17
04/07
04/21
05/05
05/19
06/09
06/23
07/07
07/21
08/04
08/18
Date
Market Volume
State Volume

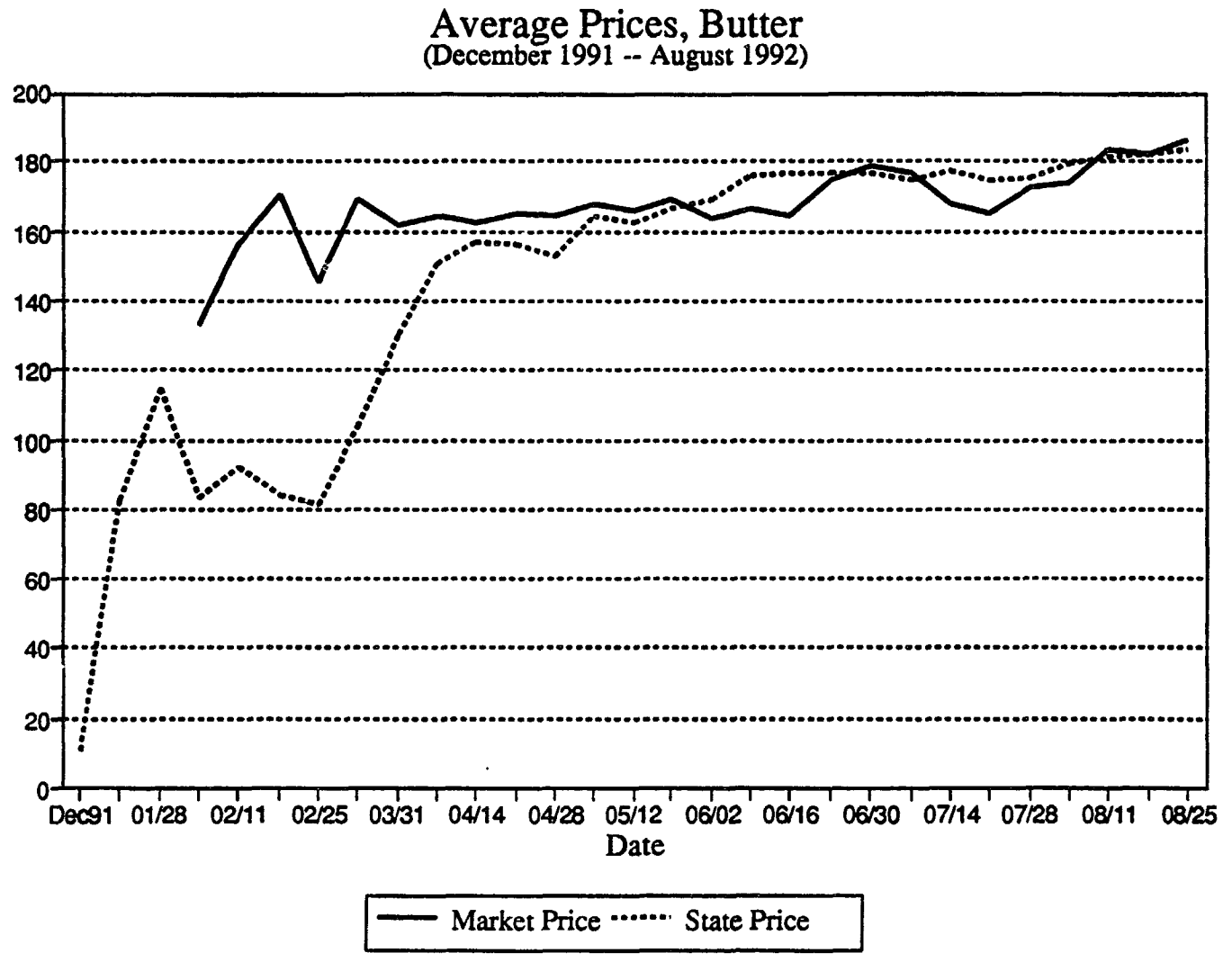

Average Prices, Sausage I
(December 1991 -- August 1992)
Price
160
140
120
100
80
60
40
20
0
Dec91
01/28
02/11
02/25
03/31
04/14
04/28
05/12
06/02
06/16
06/30
07/14
07/28
08/11
08/25
Date
Market Price
State Price

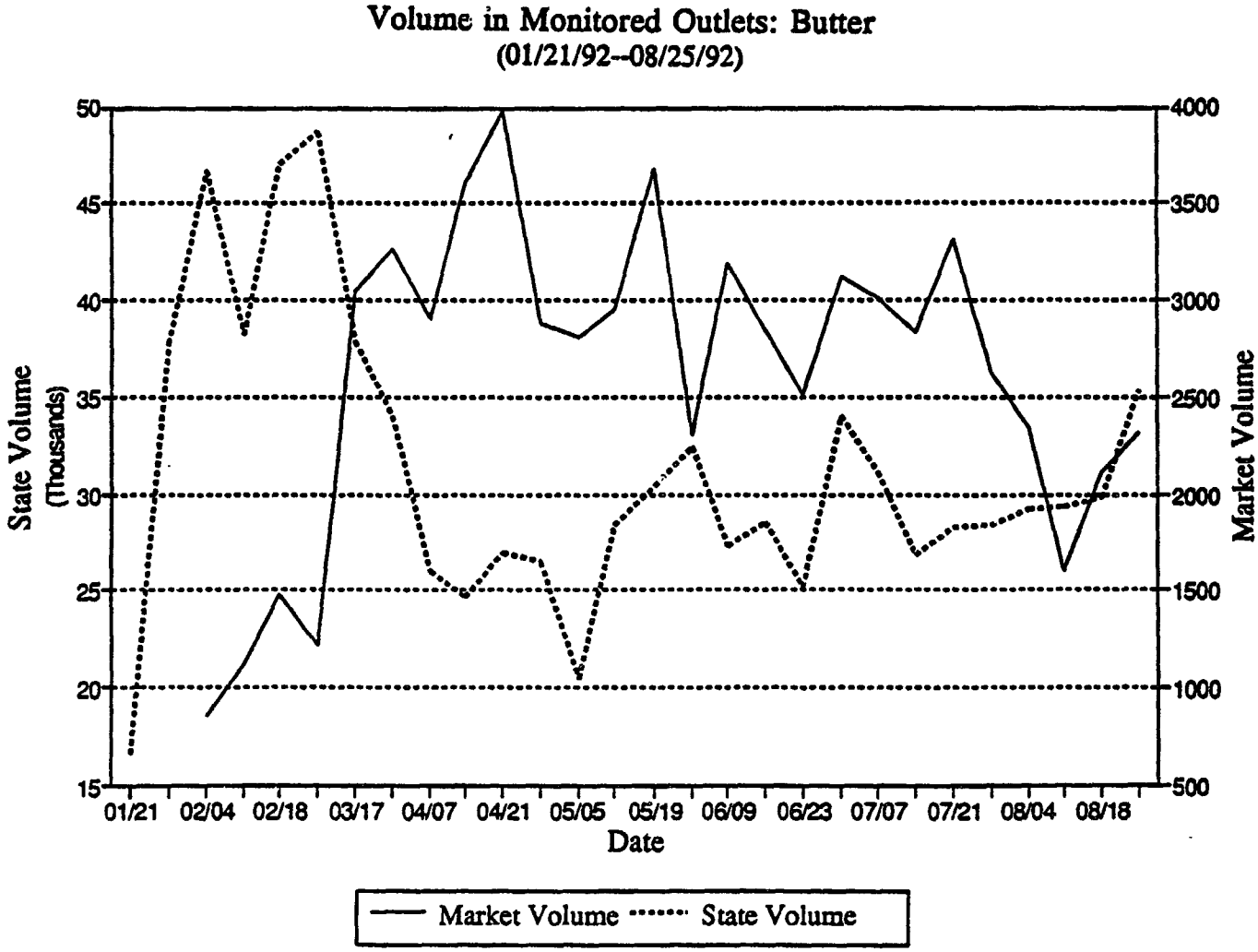

Volume in Monitored Outlets: Sausage I
(01/21/92--08/25/92)
State Volume
(Thousands)
Market Volume
55
50
45
40
35
30
25
20
15
10
5
160
140
120
100
80
60
40
20
0
01/21
02/04
02/18
03/17
04/07
04/21
05/05
05/19
06/09
06/23
07/07
07/21
08/04
08/18
Date
Market Volume
State Volume

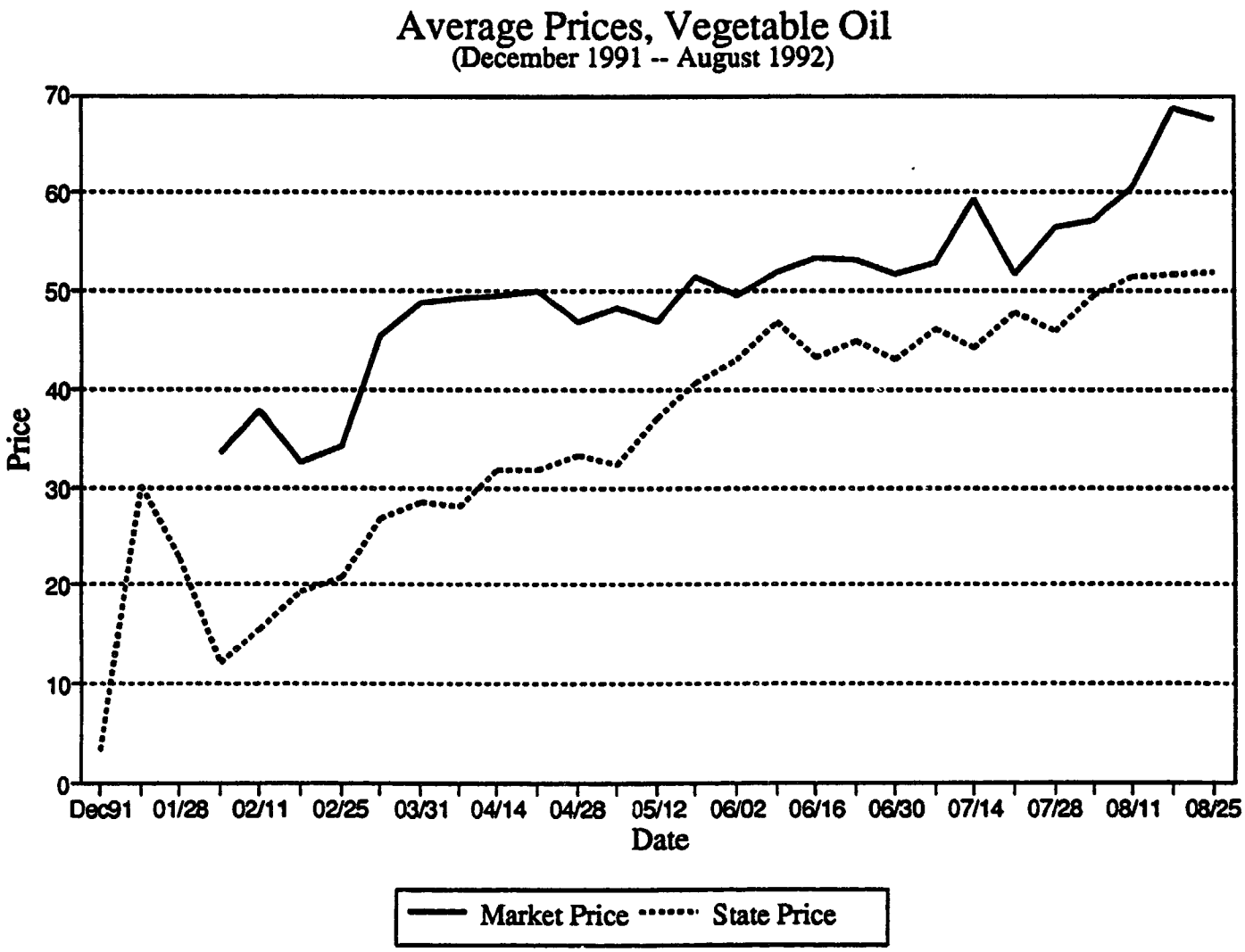

Average Prices, Sausage II
(December 1991 -- August 1992)
300
250
200
150
100
50
0
Price
Dec91
01/28
02/11
02/25
03/31
04/14
04/28
05/12
06/02
06/16
06/30
07/14
07/28
08/11
08/25
Date
Market Price
State Price

Volume in Monitored Outlets: Sausage II
(01/21/92--08/25/92)

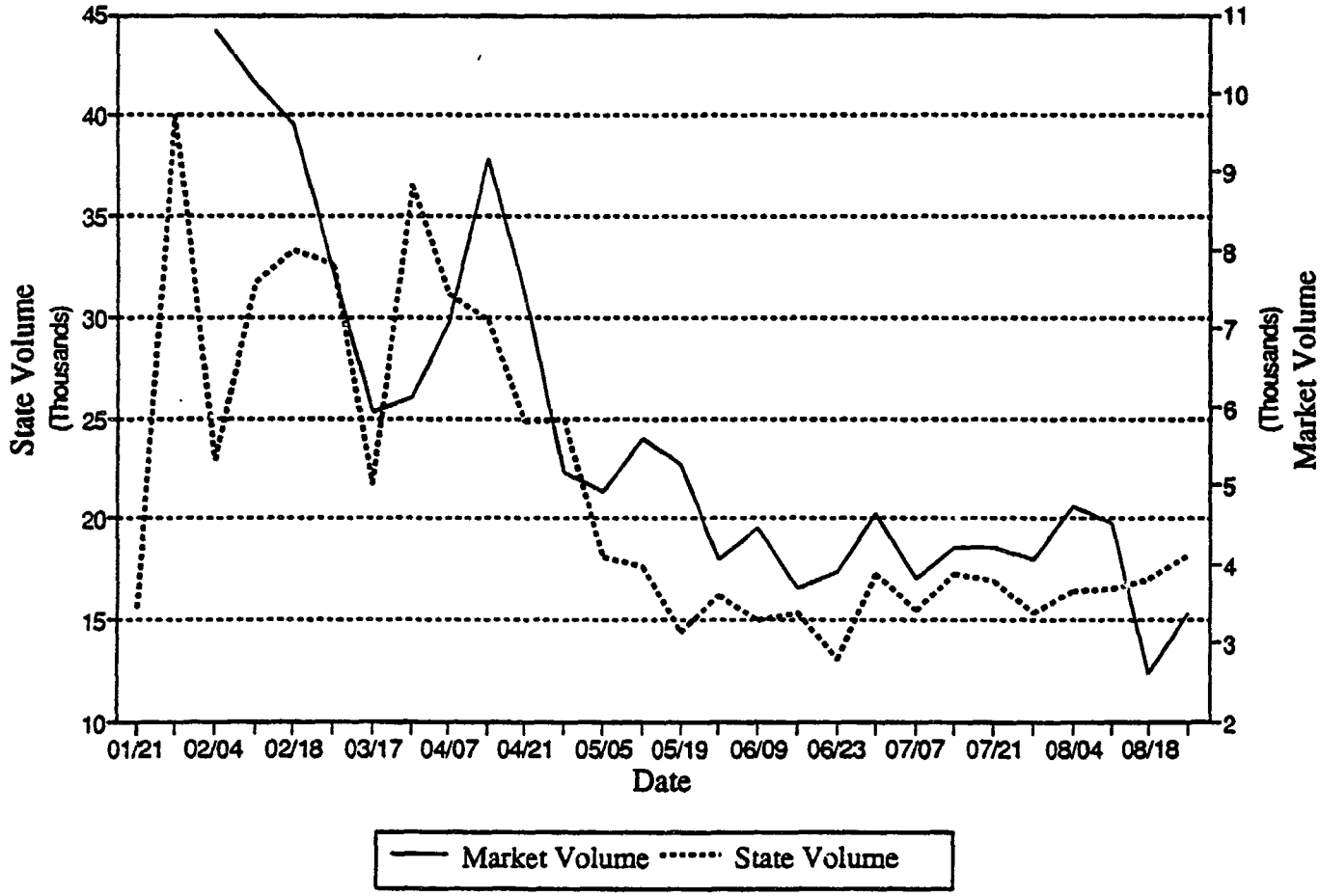


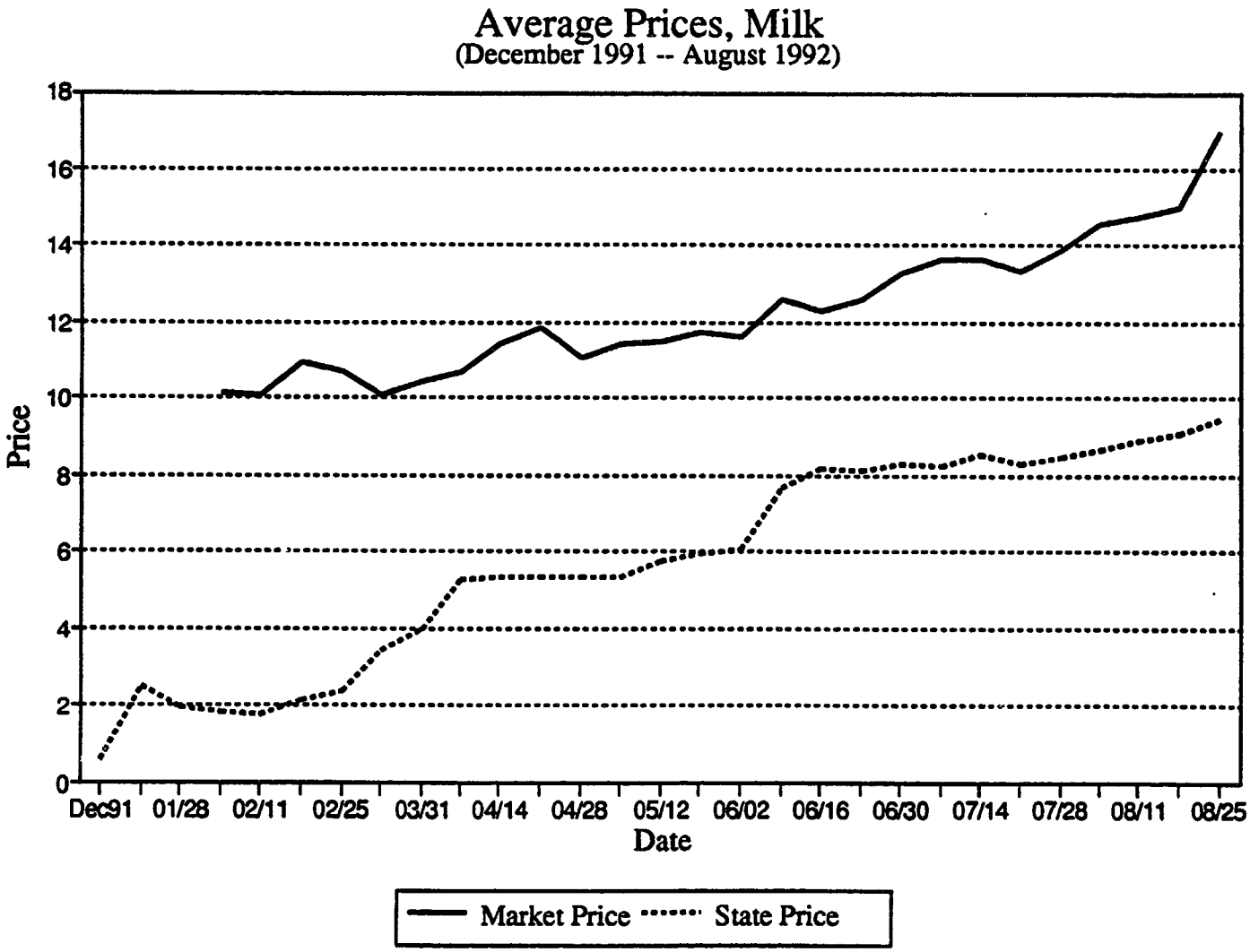

Average Prices, Butter
(December 1991 -- August 1992)
200
180
160
140
120
100
80
60
40
20
0
Dec91
01/28
02/11
02/25
03/31
04/14
04/28
05/12
06/02
06/16
06/30
07/14
07/28
08/11
08/25
Date
Market Price
State Price

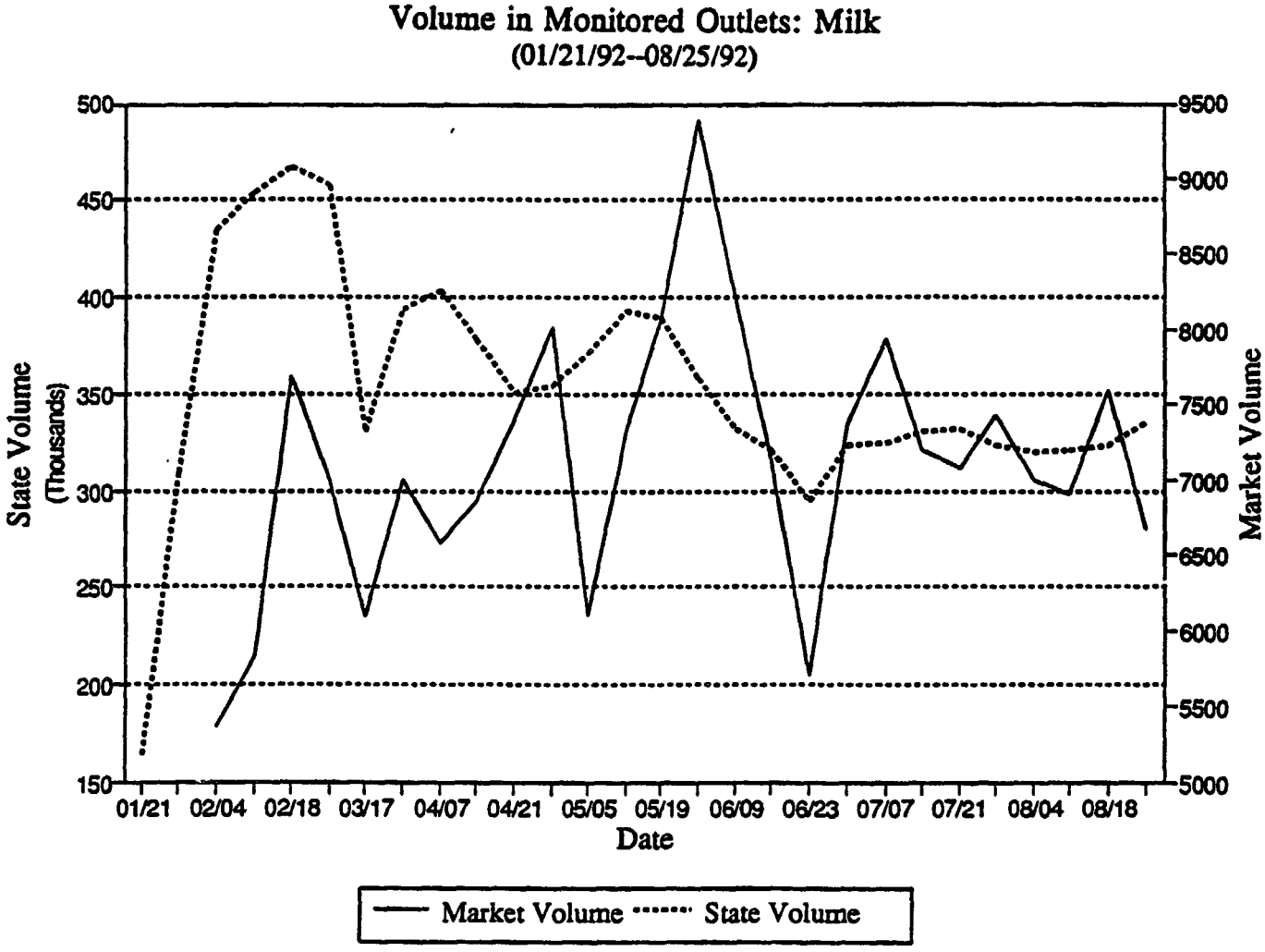

Volume in Monitored Outlets: Butter
(01/21/92--08/25/92)
State Volume
(Thousands)
Market Volume
50
45
40
35
30
25
20
15
4000
3500
3000
2500
2000
1500
1000
500
01/21
02/04
02/18
03/17
04/07
04/21
05/05
05/19
06/09
06/23
07/07
07/21
08/04
08/18
Date
Market Volume
State Volume

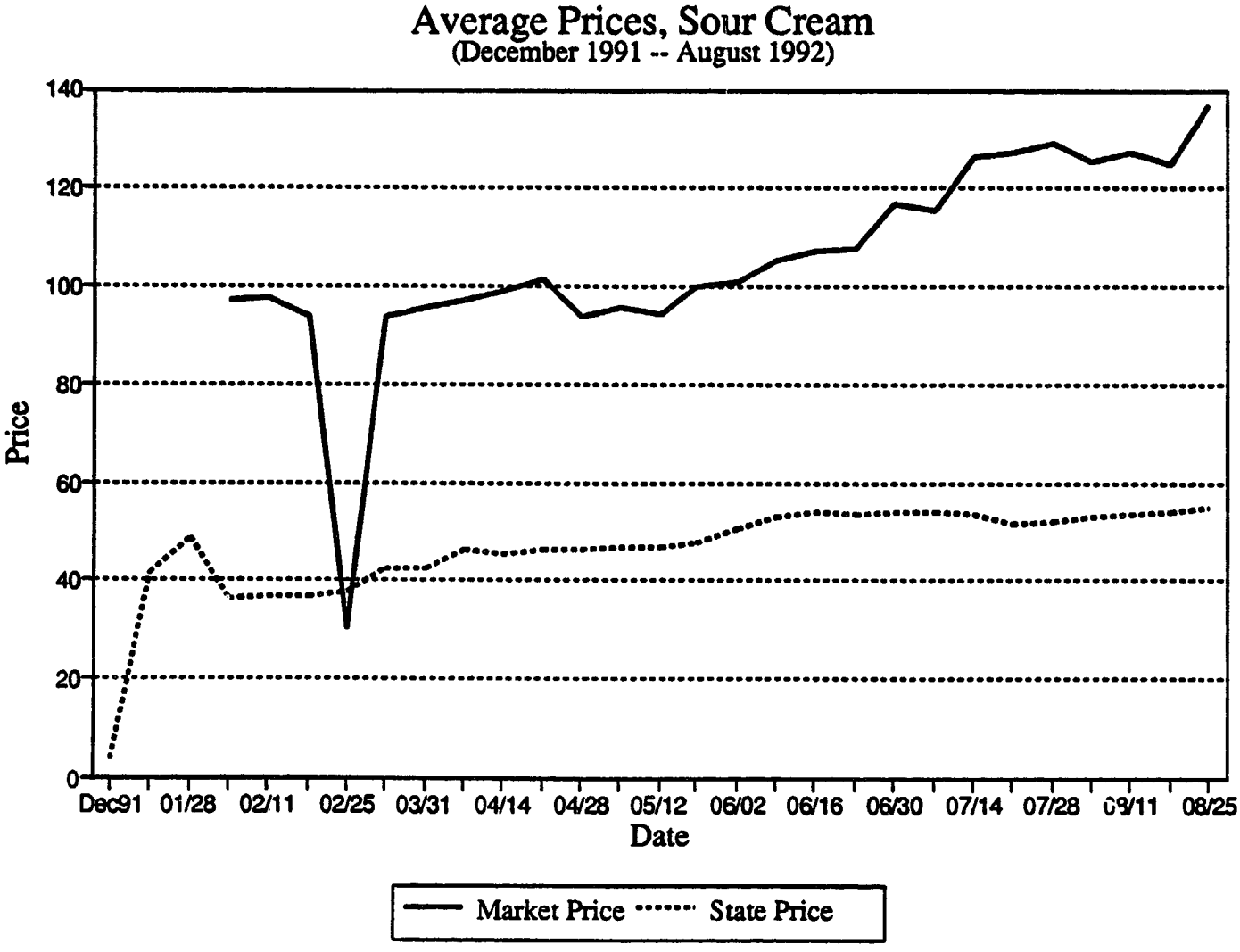

Average Prices, Vegetable Oil
(December 1991 -- August 1992)
Price
70
60
50
40
30
20
10
0
Dec91
01/28
02/11
02/25
03/31
04/14
04/28
05/12
06/02
06/16
06/30
07/14
07/28
08/11
08/25
Date
Market Price
State Price

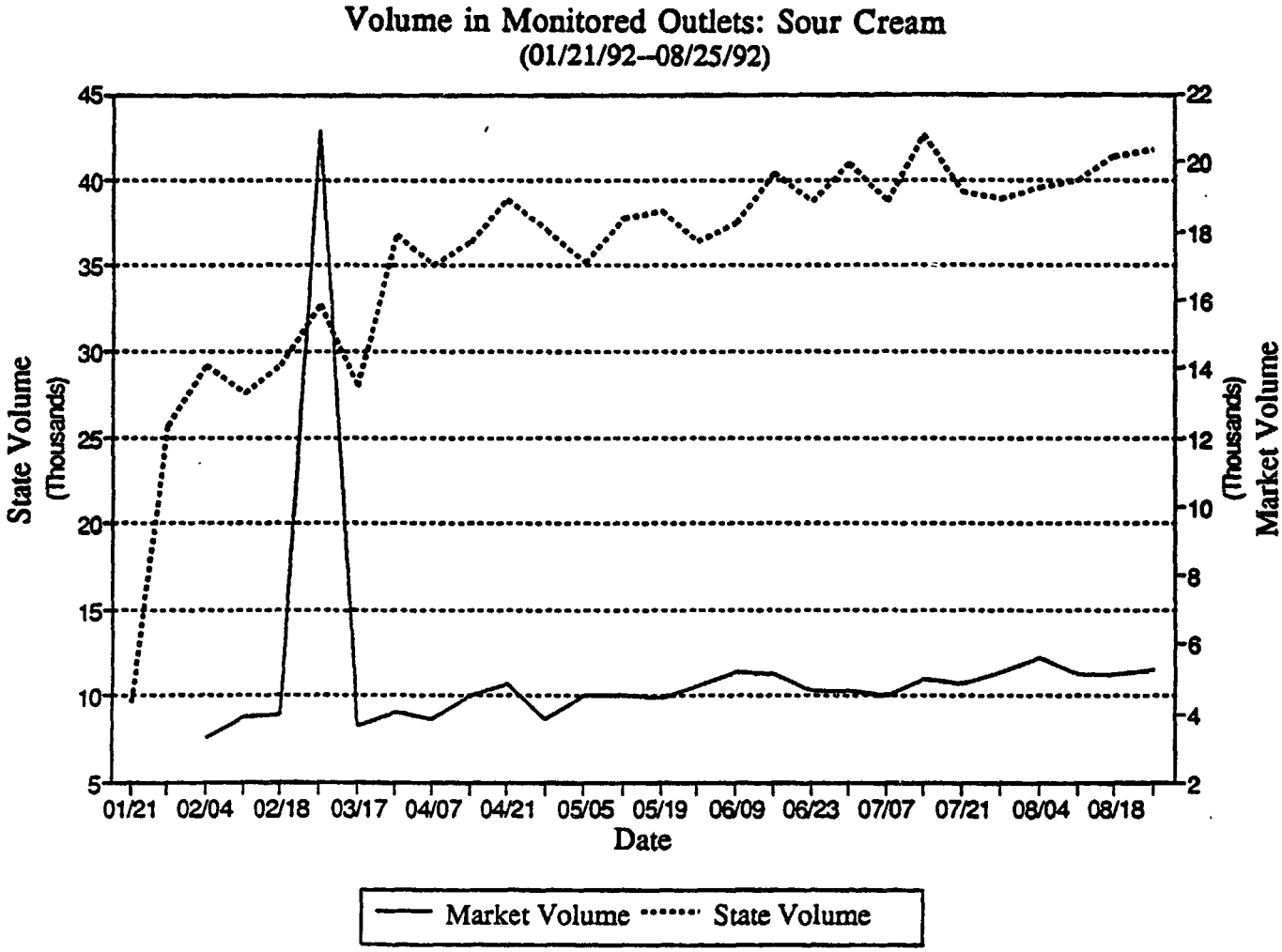
Volume in Monitored Outlets: Vegetable Oil
(01/21/92--08/25/92)

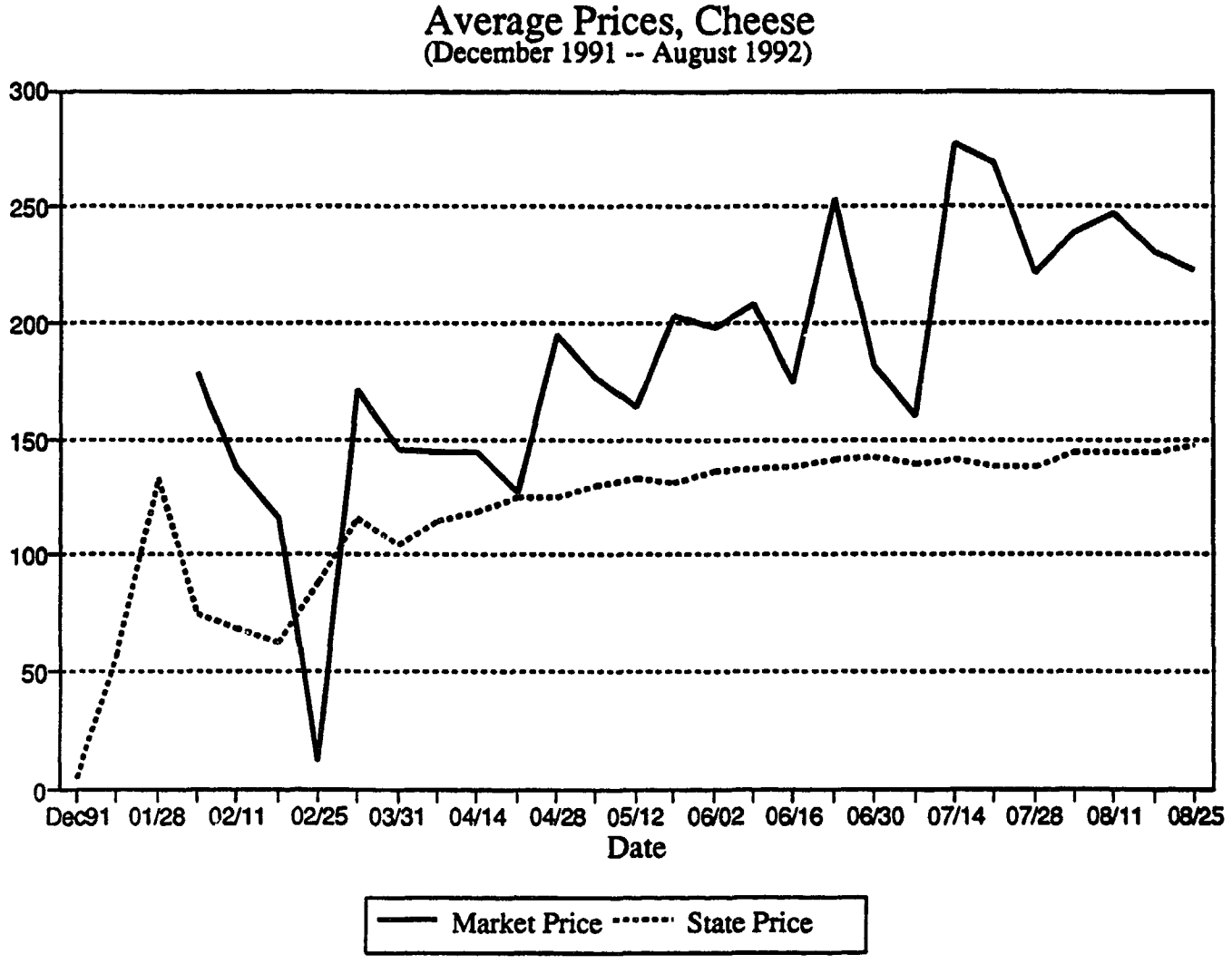



Average Prices, Milk
(December 1991 -- August 1992)
Price
18
16
14
12
10
8
6
4
2
0
Dec91
01/28
02/11
02/25
03/31
04/14
04/28
05/12
06/02
06/16
06/30
07/14
07/28
08/11
08/25
Date
Market Price
State Price

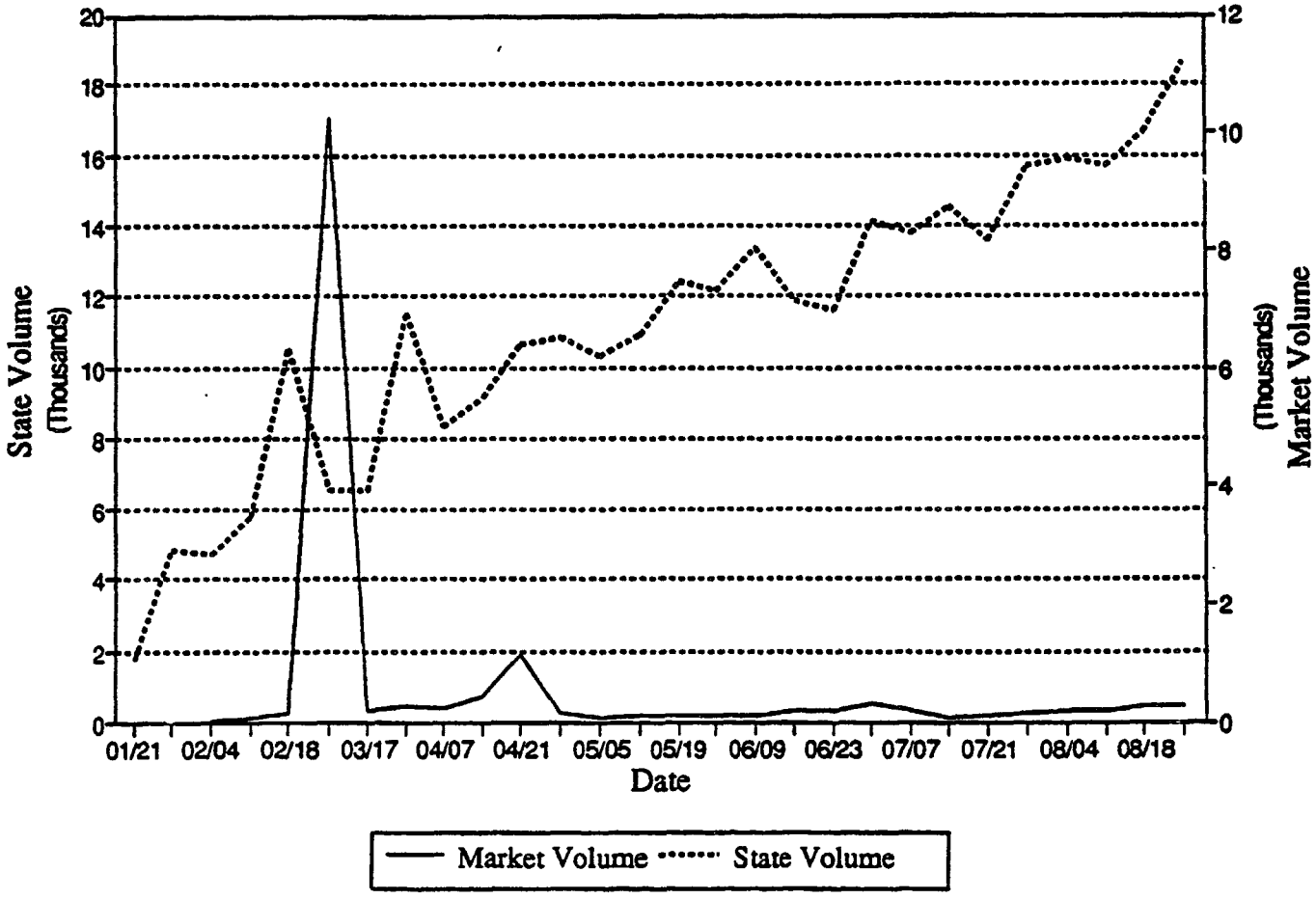

Volume in Monitored Outlets: Milk
(01/21/92--08/25/92)
State Volume
(Thousands)
Market Volume
500
450
400
350
300
250
200
150
9500
9000
8500
8000
7500
7000
6500
6000
5500
5000
01/21
02/04
02/18
03/17
04/07
04/21
05/05
05/19
06/09
06/23
07/07
07/21
08/04
08/18
Date
Market Volume
State Volume

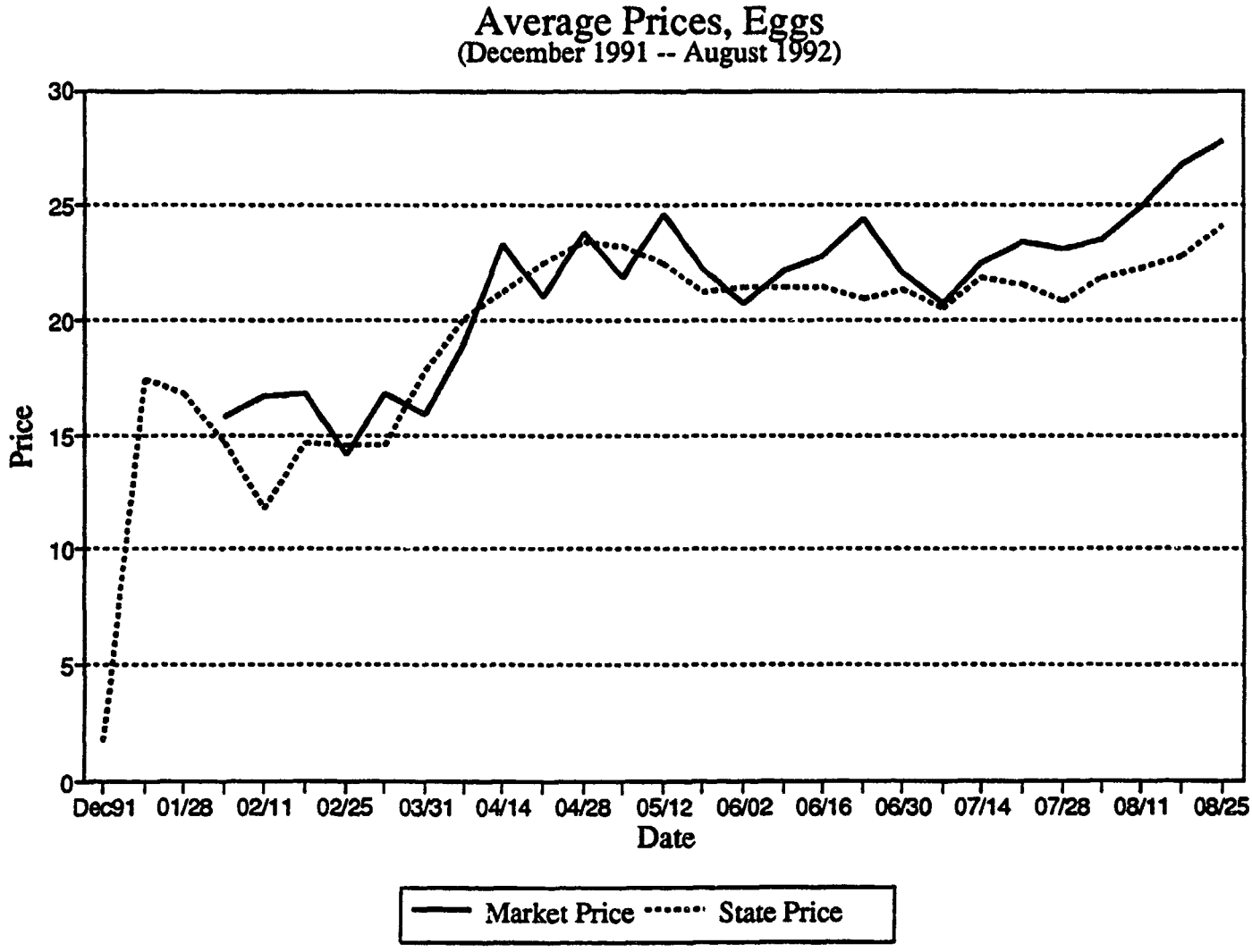

Average Prices, Sour Cream
(December 1991 -- August 1992)
140
120
100
80
60
40
20
0
Price
Dec91
01/28
02/11
02/25
03/31
04/14
04/28
05/12
06/02
06/16
06/30
07/14
07/28
08/11
08/25
Date
Market Price
State Price

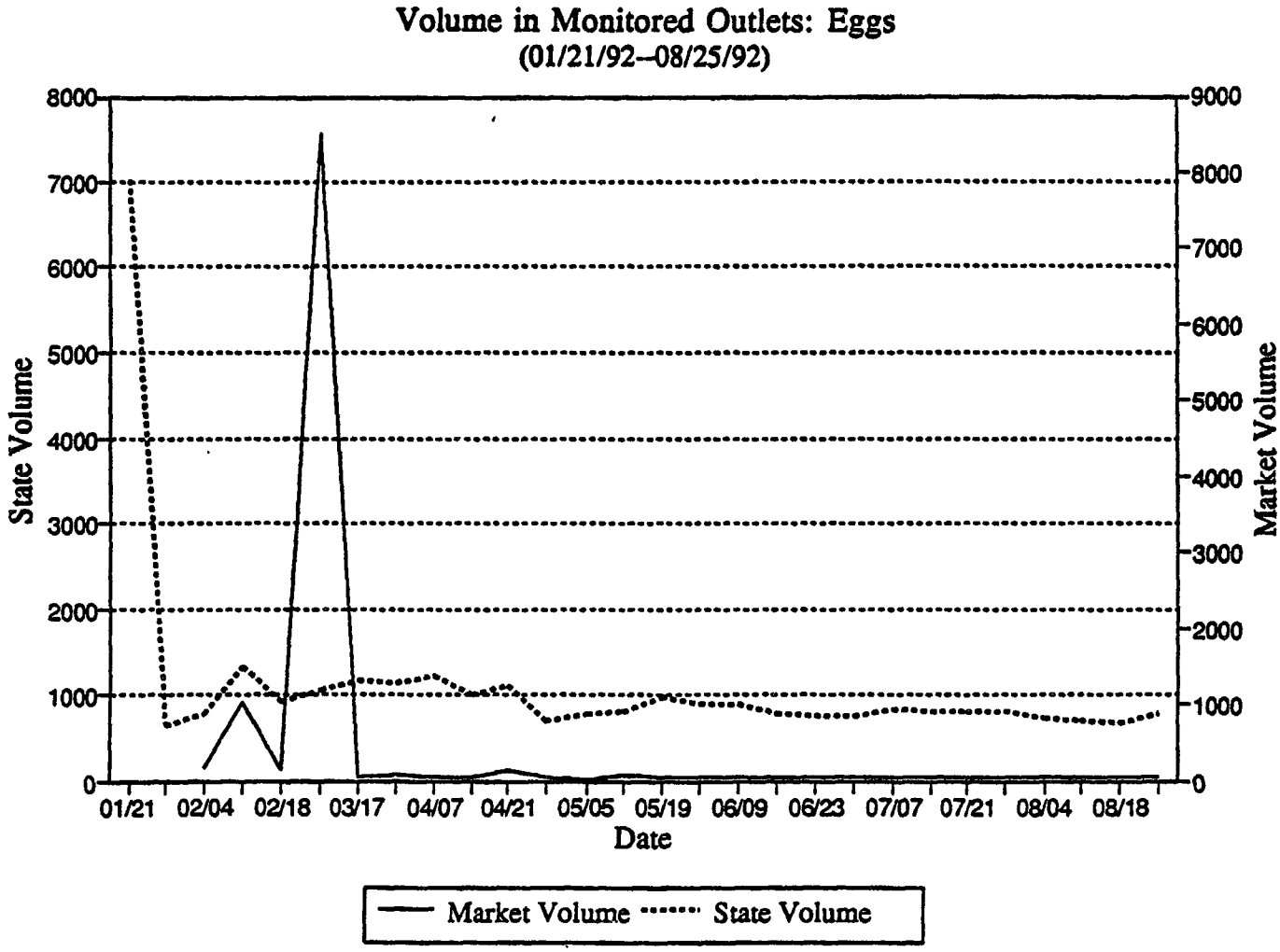

Volume in Monitored Outlets: Sour Cream
(01/21/92--08/25/92)
State Volume
(Thousands)
Market Volume
(Thousands)
45
40
35
30
25
20
15
10
5
22
20
18
16
14
12
10
8
6
4
2
01/21
02/04
02/18
03/17
04/07
04/21
05/05
05/19
06/09
06/23
07/07
07/21
08/04
08/18
Date
Market Volume
State Volume

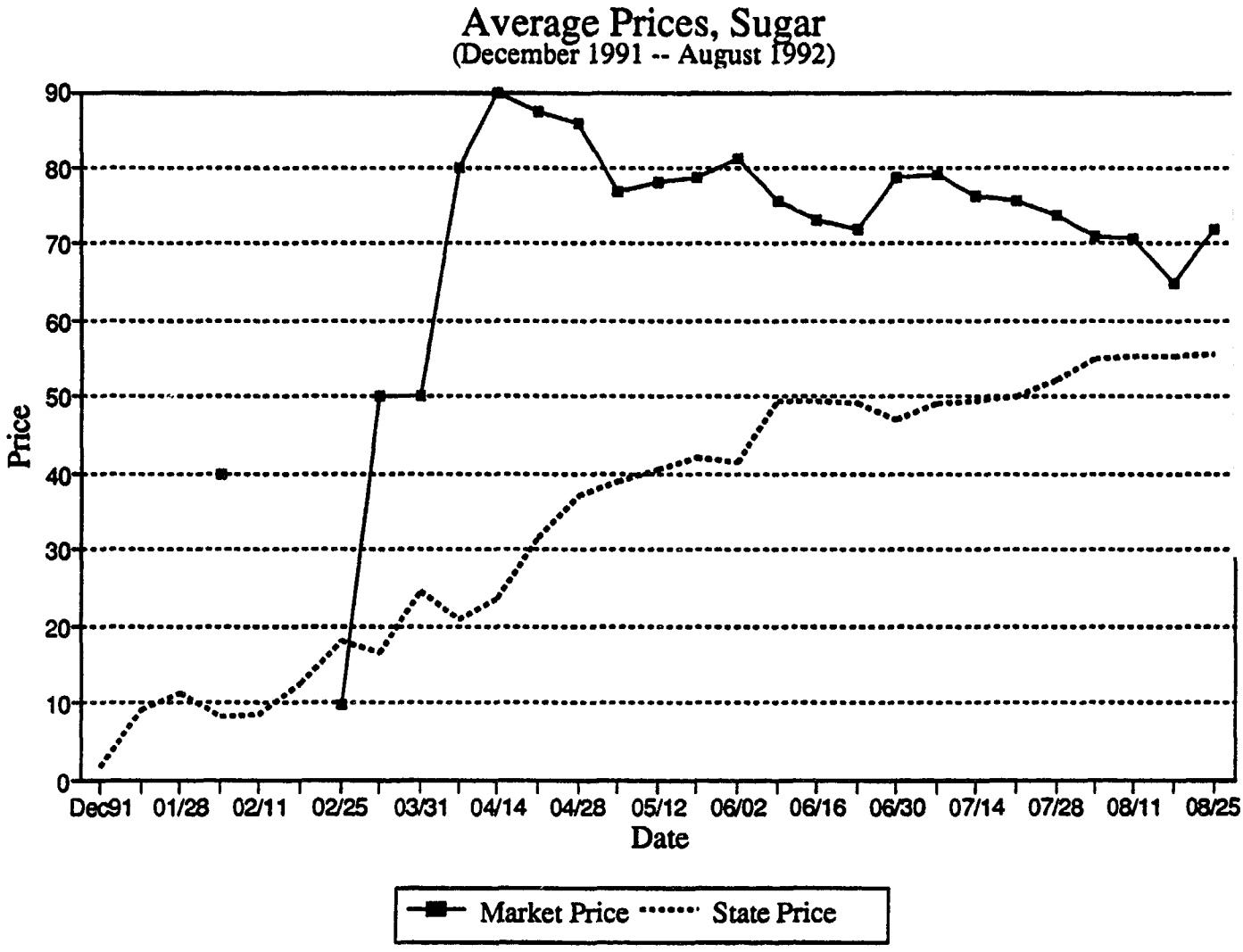

Average Prices, Cheese
(December 1991 -- August 1992)
300
250
200
150
100
50
0
Dec91
01/28
02/11
02/25
03/31
04/14
04/28
05/12
06/02
06/16
06/30
07/14
07/28
08/11
08/25
Date
Market Price
State Price

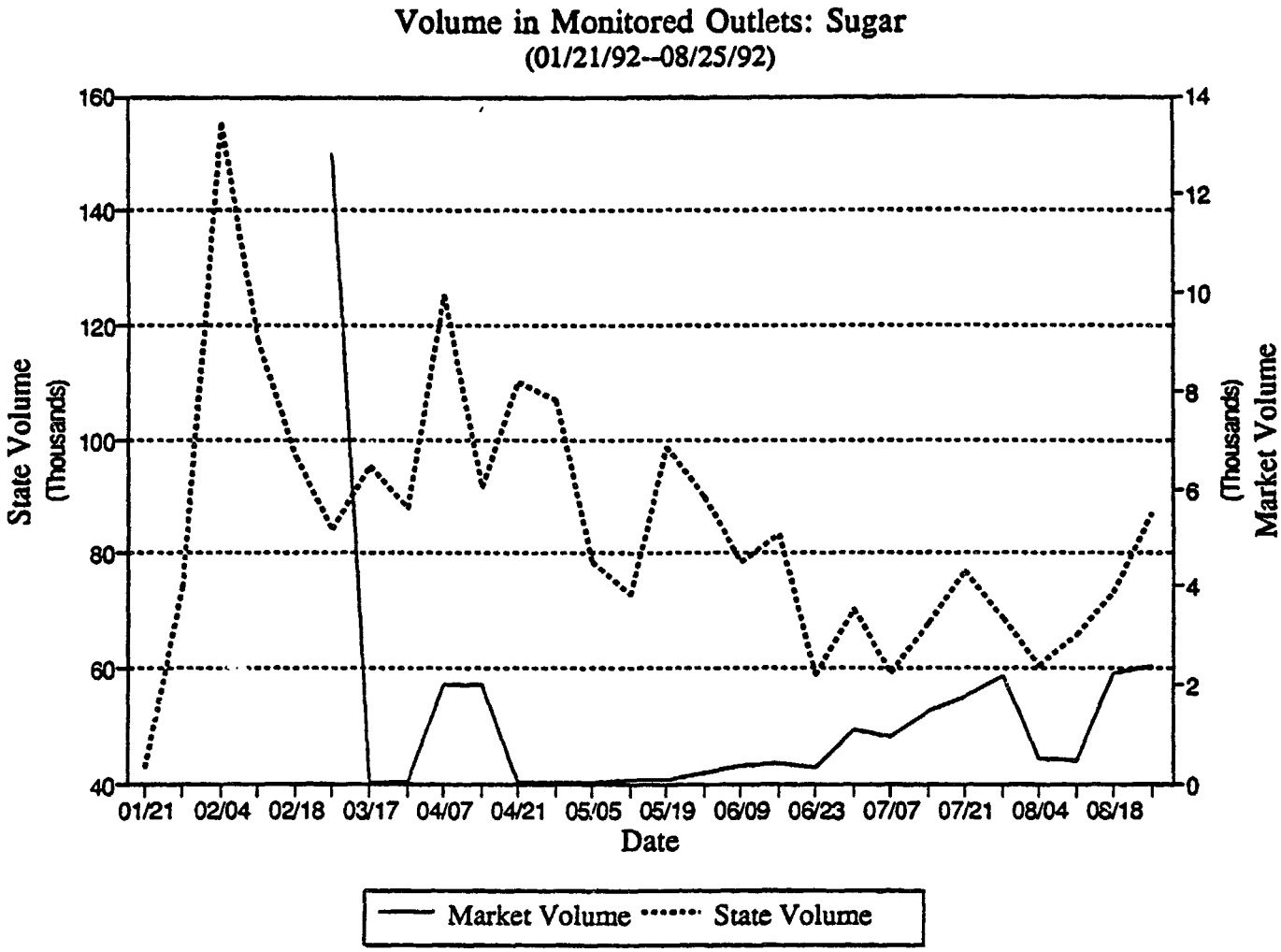
Volume in Monitored Outlets: Cheese
(01/21/92–08/25/92)

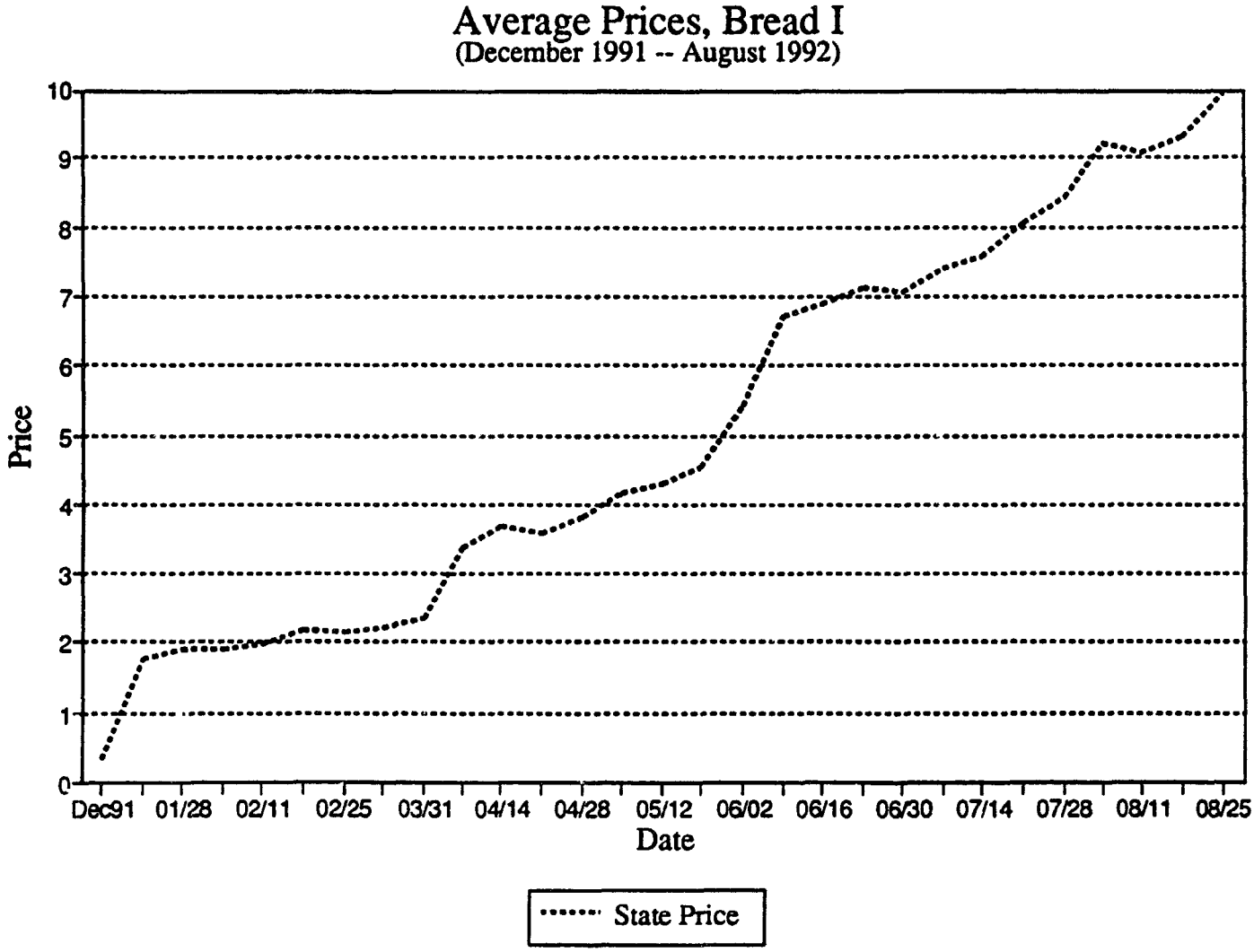


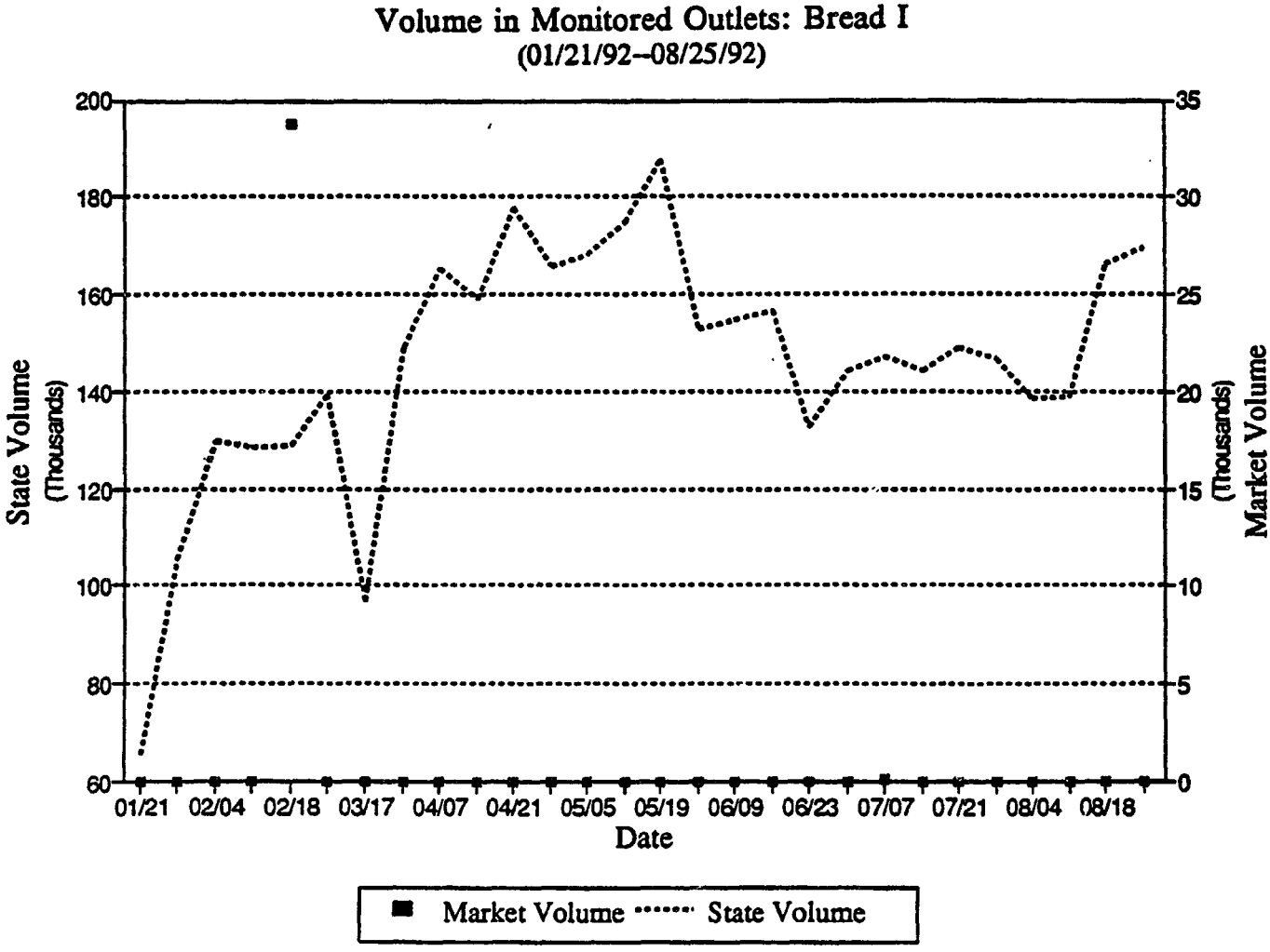

Average Prices, Eggs
(December 1991 -- August 1992)
Price
30
25
20
15
10
5
0
Dec91
01/28
02/11
02/25
03/31
04/14
04/28
05/12
06/02
06/16
06/30
07/14
07/28
08/11
08/25
Date
Market Price
State Price


Volume in Monitored Outlets: Eggs
(01/21/92--08/25/92)
State Volume
Market Volume
8000
7000
6000
5000
4000
3000
2000
1000
0
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
01/21
02/04
02/18
03/17
04/07
04/21
05/05
05/19
06/09
06/23
07/07
07/21
08/04
08/18
Date
Market Volume
State Volume

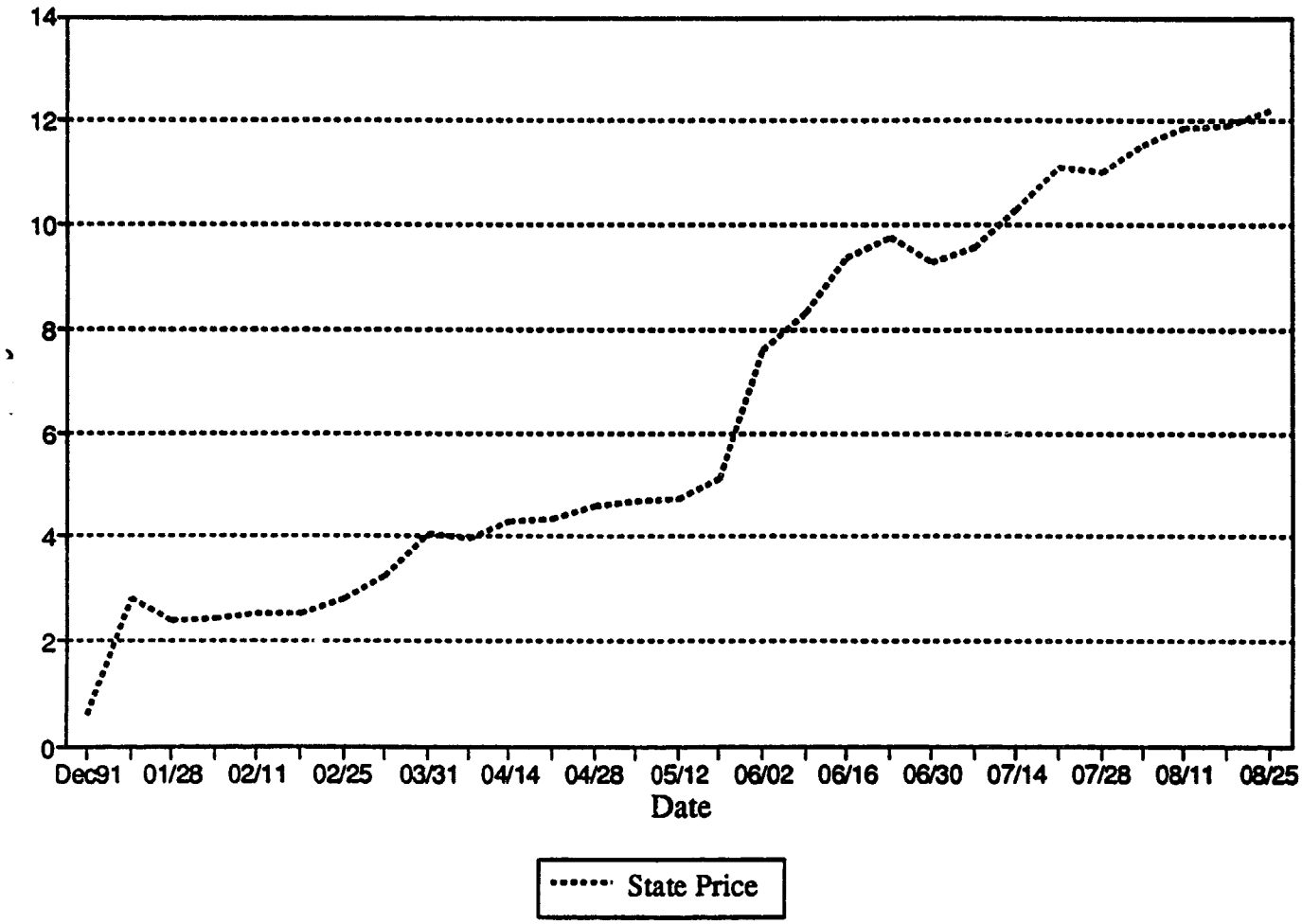

Average Prices, Sugar
(December 1991 -- August 1992)
Price
90
80
70
60
50
40
30
20
10
0
Dec91
01/28
02/11
02/25
03/31
04/14
04/28
05/12
06/02
06/16
06/30
07/14
07/28
08/11
08/25
Date
Market Price
State Price

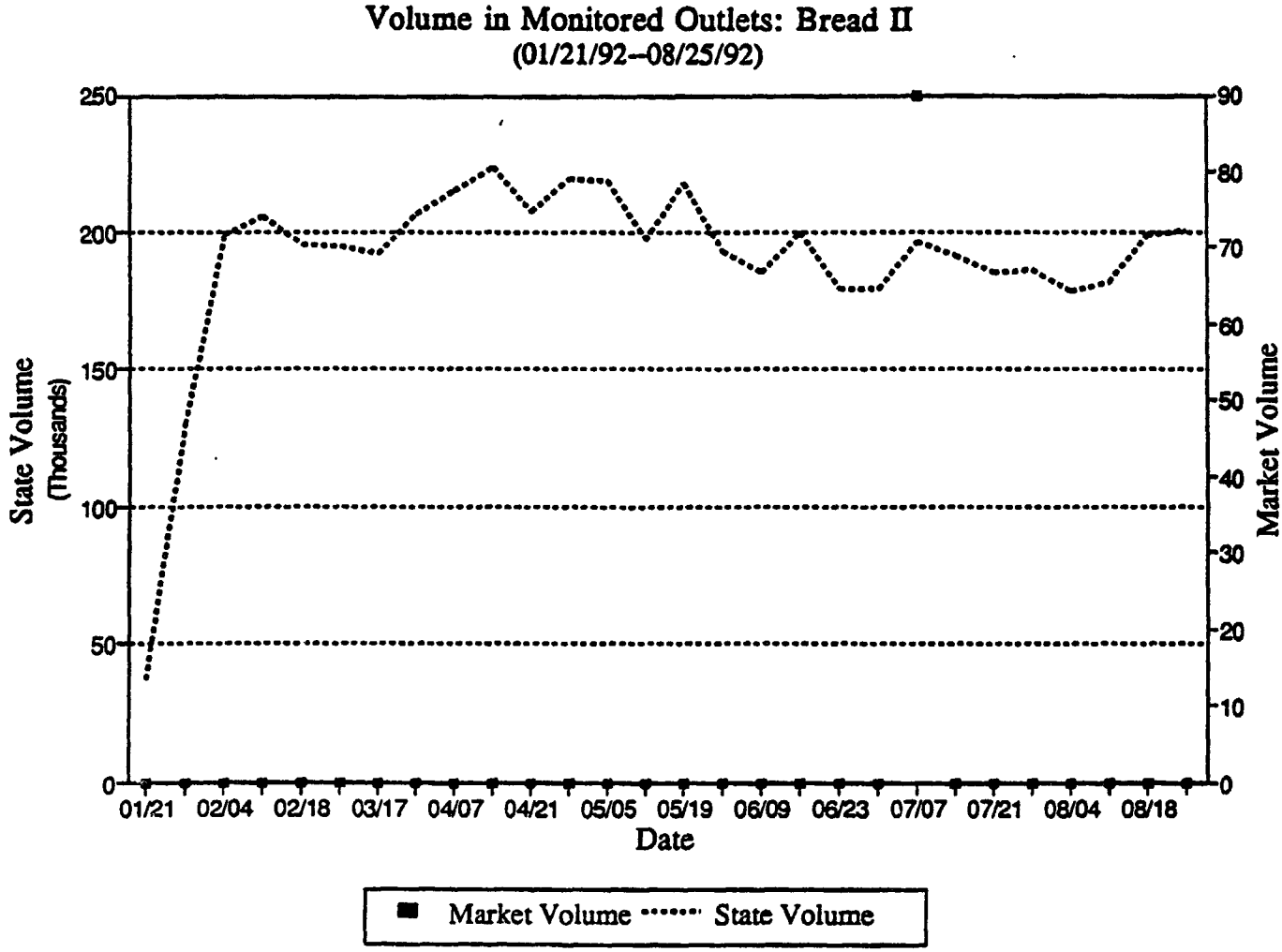

Volume in Monitored Outlets: Sugar
(01/21/92--08/25/92)
State Volume (Thousands)
Market Volume (Thousands)
160
140
120
100
80
60
40
14
12
10
8
6
4
2
0
01/21
02/04
02/18
03/17
04/07
04/21
05/05
05/19
06/09
06/23
07/07
07/21
08/04
08/18
Date
Market Volume
State Volume


Average Prices, Bread I
(December 1991 -- August 1992)
Price
10
9
8
7
6
5
4
3
2
1
0
Dec91
01/28
02/11
02/25
03/31
04/14
04/28
05/12
06/02
06/16
06/30
07/14
07/28
08/11
08/25
Date
State Price

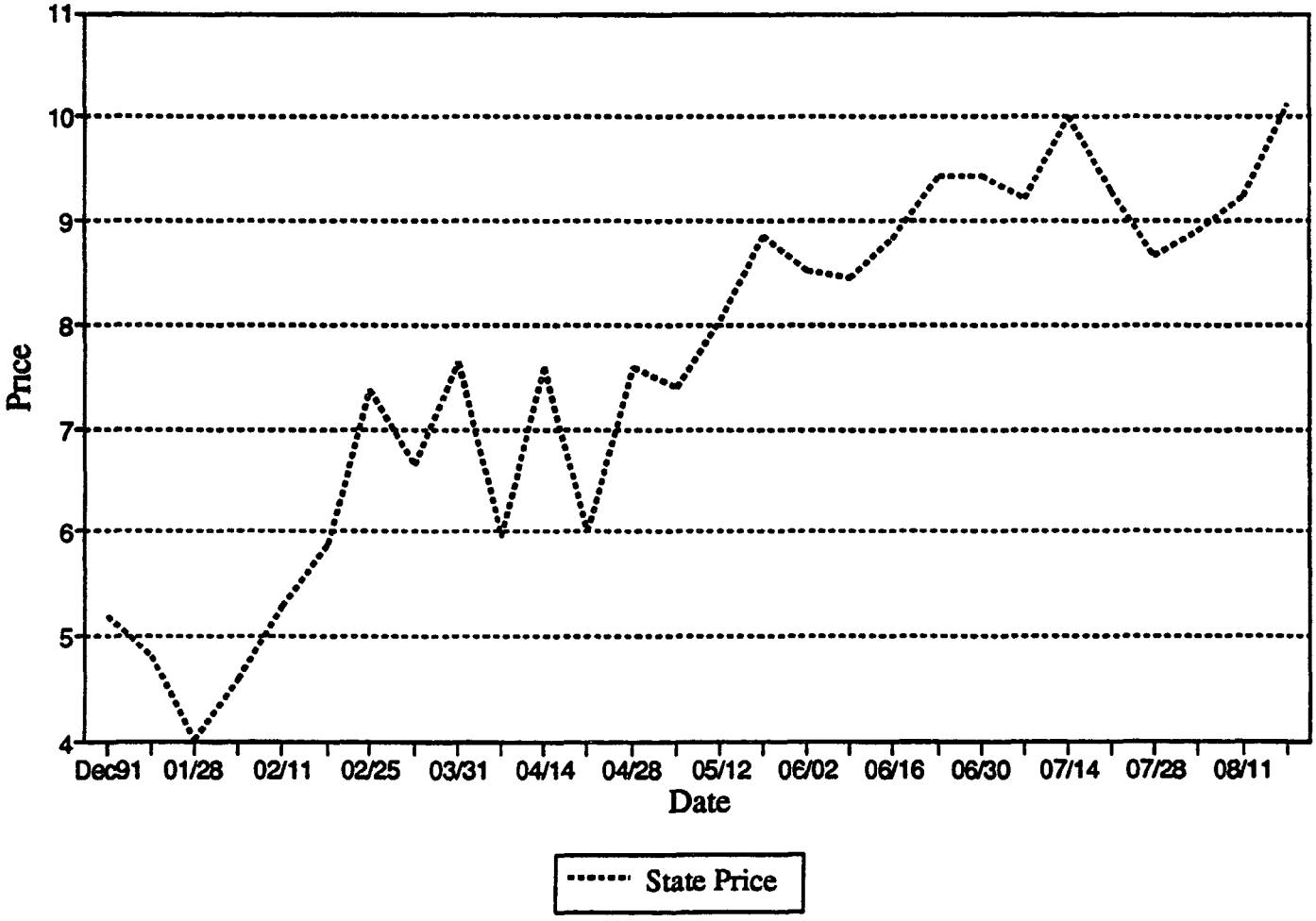

Volume in Monitored Outlets: Bread I
(01/21/92–08/25/92)
State Volume (Thousands)
Market Volume (Thousands)
200
180
160
140
120
100
80
60
35
30
25
20
15
10
5
0
01/21
02/04
02/18
03/17
04/07
04/21
05/05
05/19
06/09
06/23
07/07
07/21
08/04
08/18
Date
Market Volume
State Volume

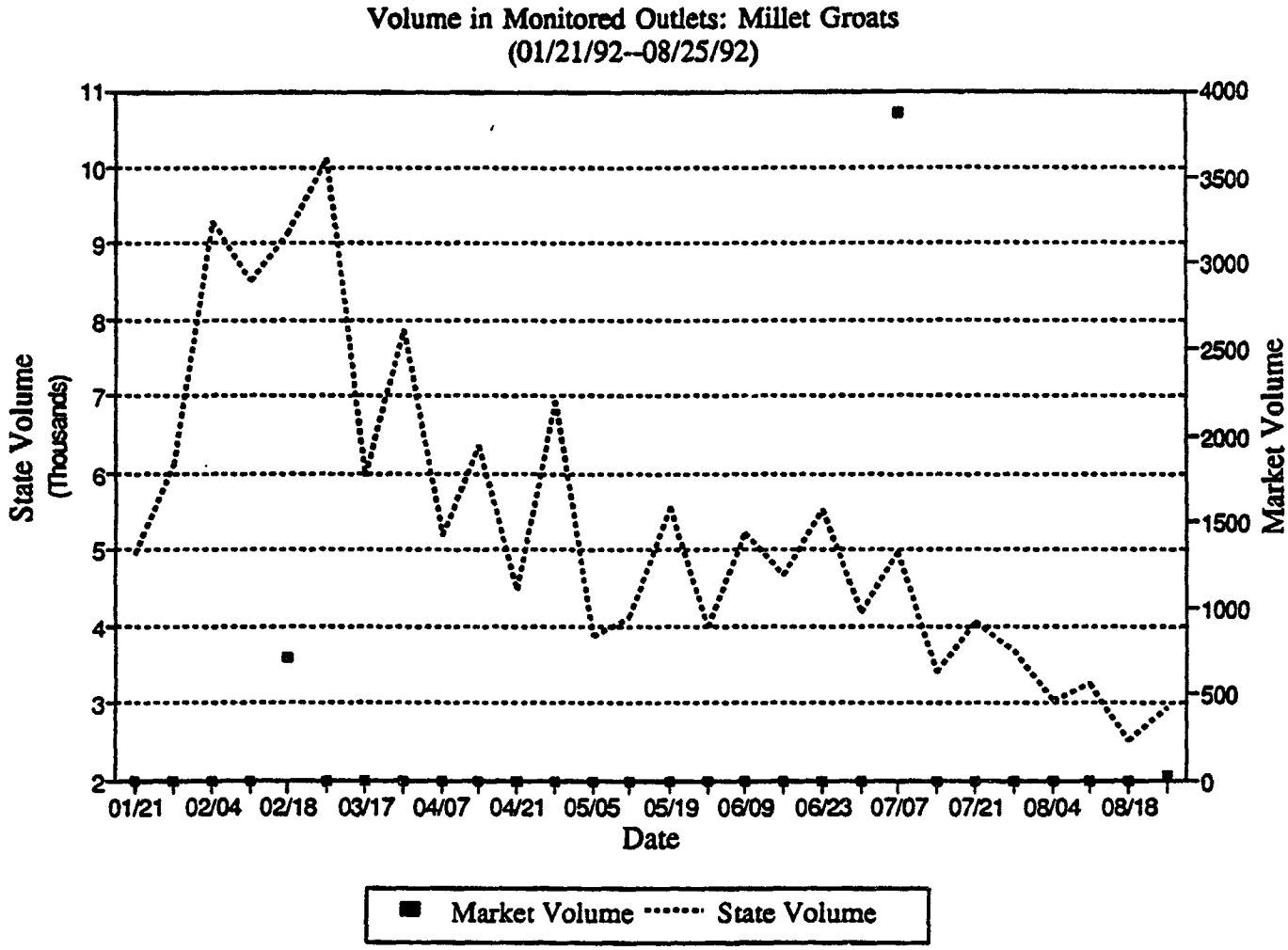
Average Prices, Bread II
(December 1991 -- August 1992)

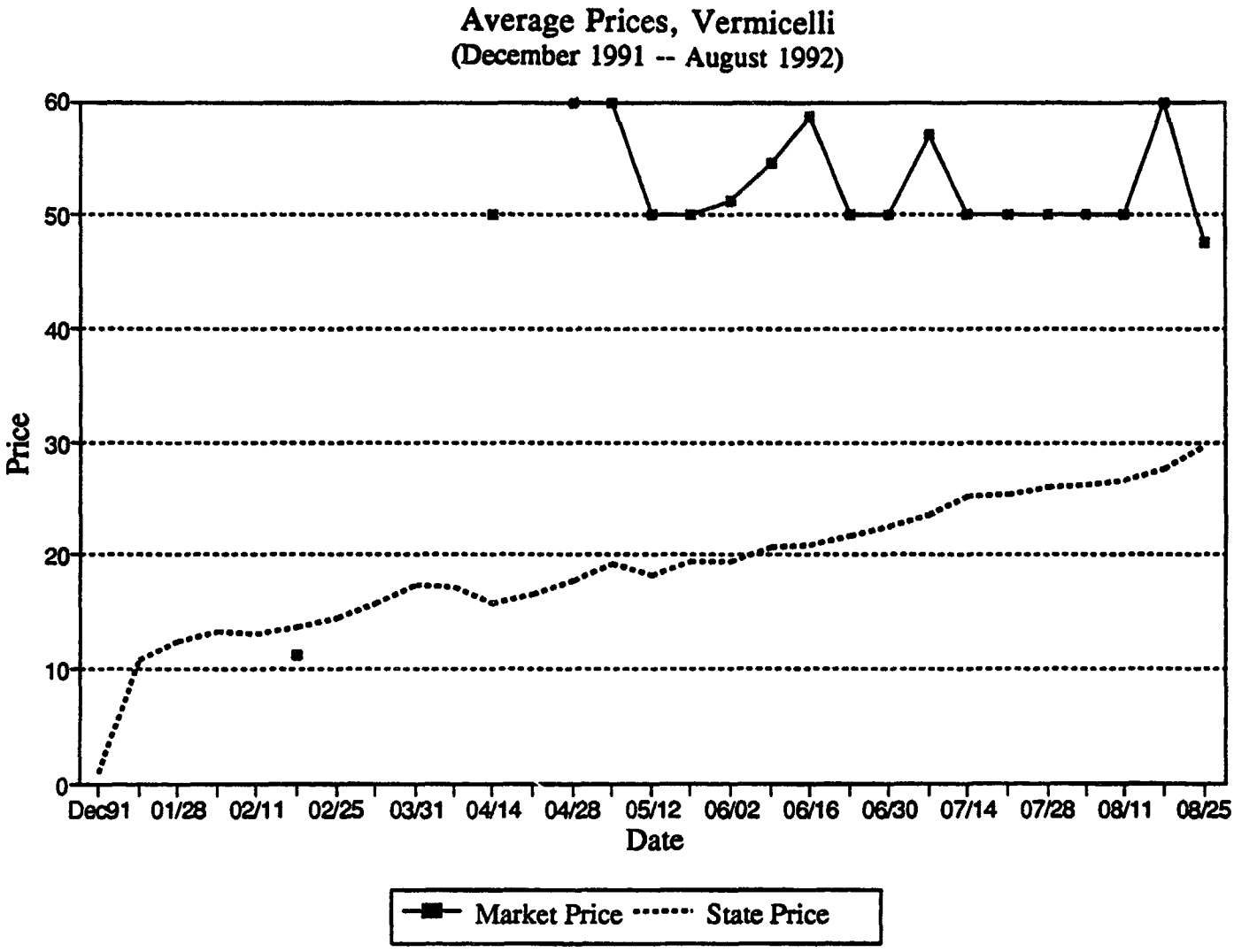


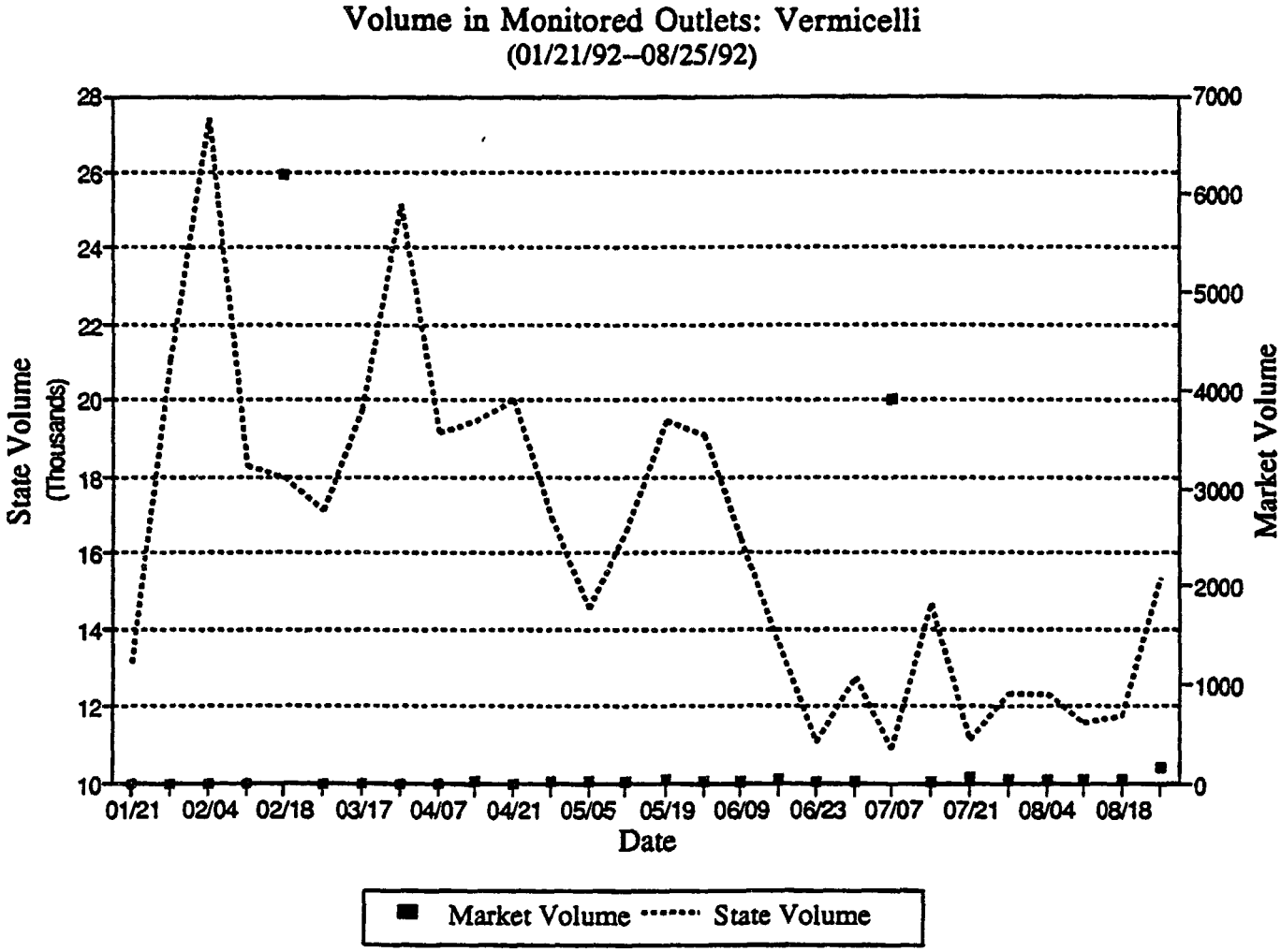

Volume in Monitored Outlets: Bread II
(01/21/92–08/25/92)
State Volume
(Thousands)
Market Volume
250
200
150
100
50
0
90
80
70
60
50
40
30
20
10
0
01/21
02/04
02/18
03/17
04/07
04/21
05/05
05/19
06/09
06/23
07/07
07/21
08/04
08/18
Date
Market Volume
State Volume

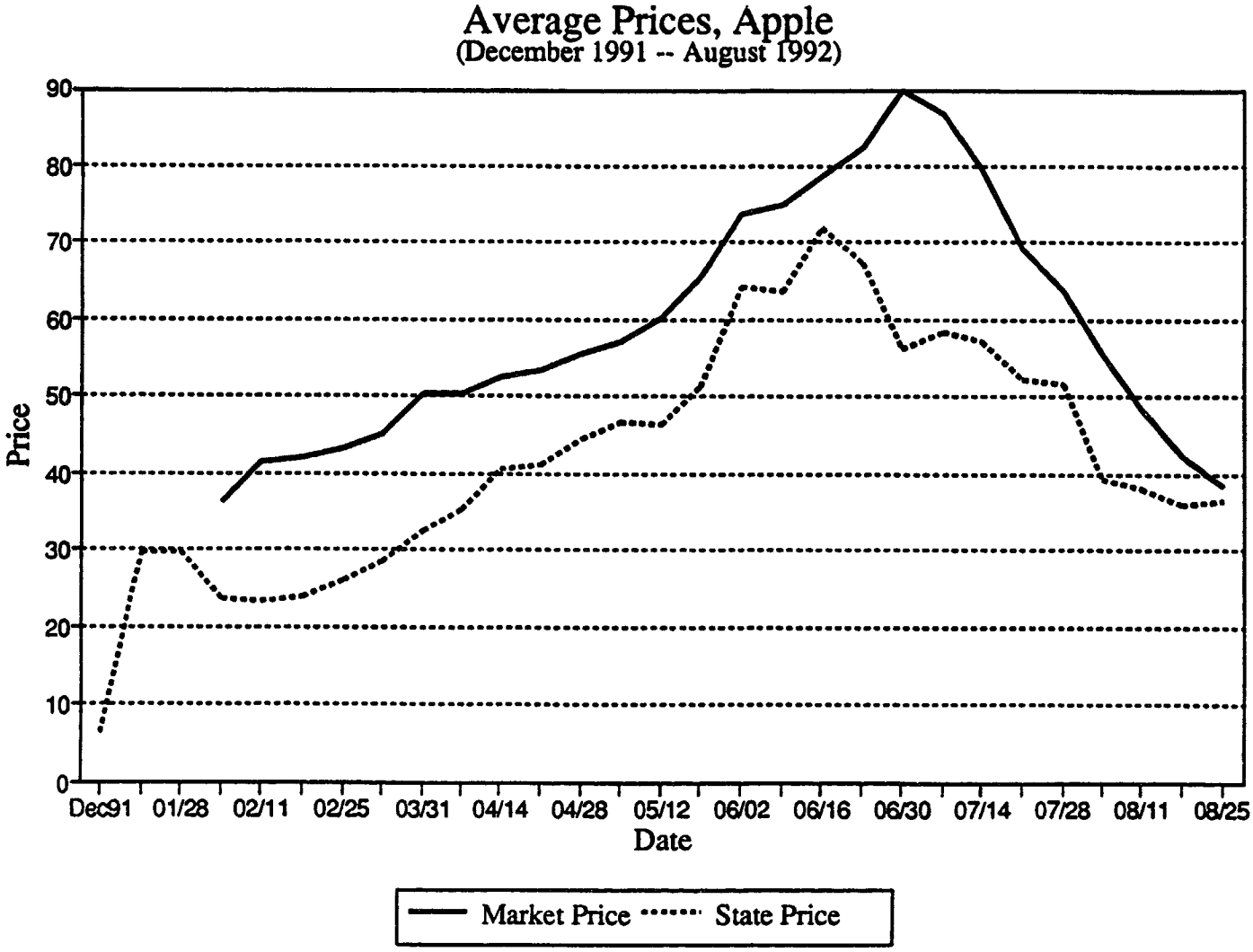
Average Prices, Millet Groats
(December 1991 -- August 1992)

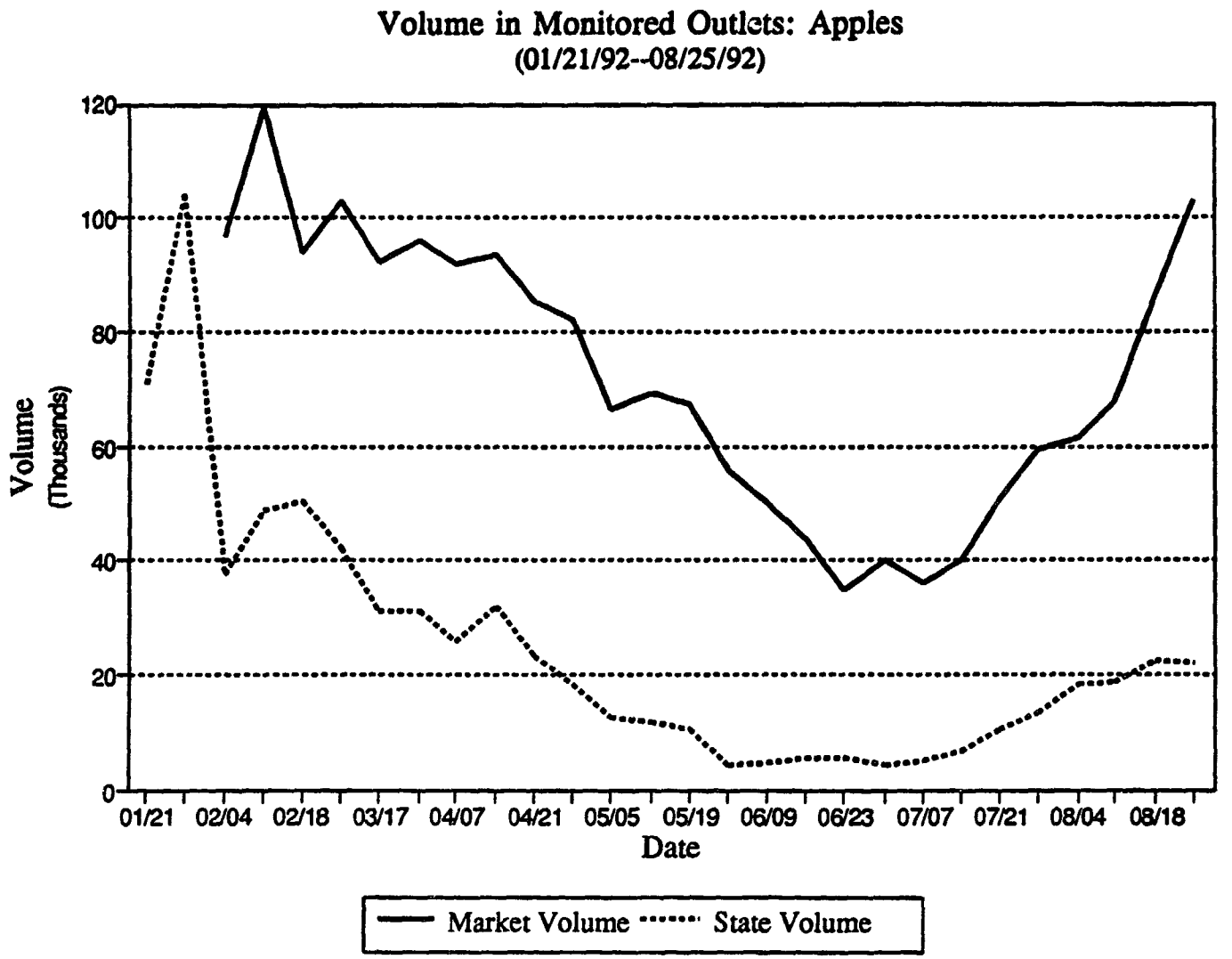


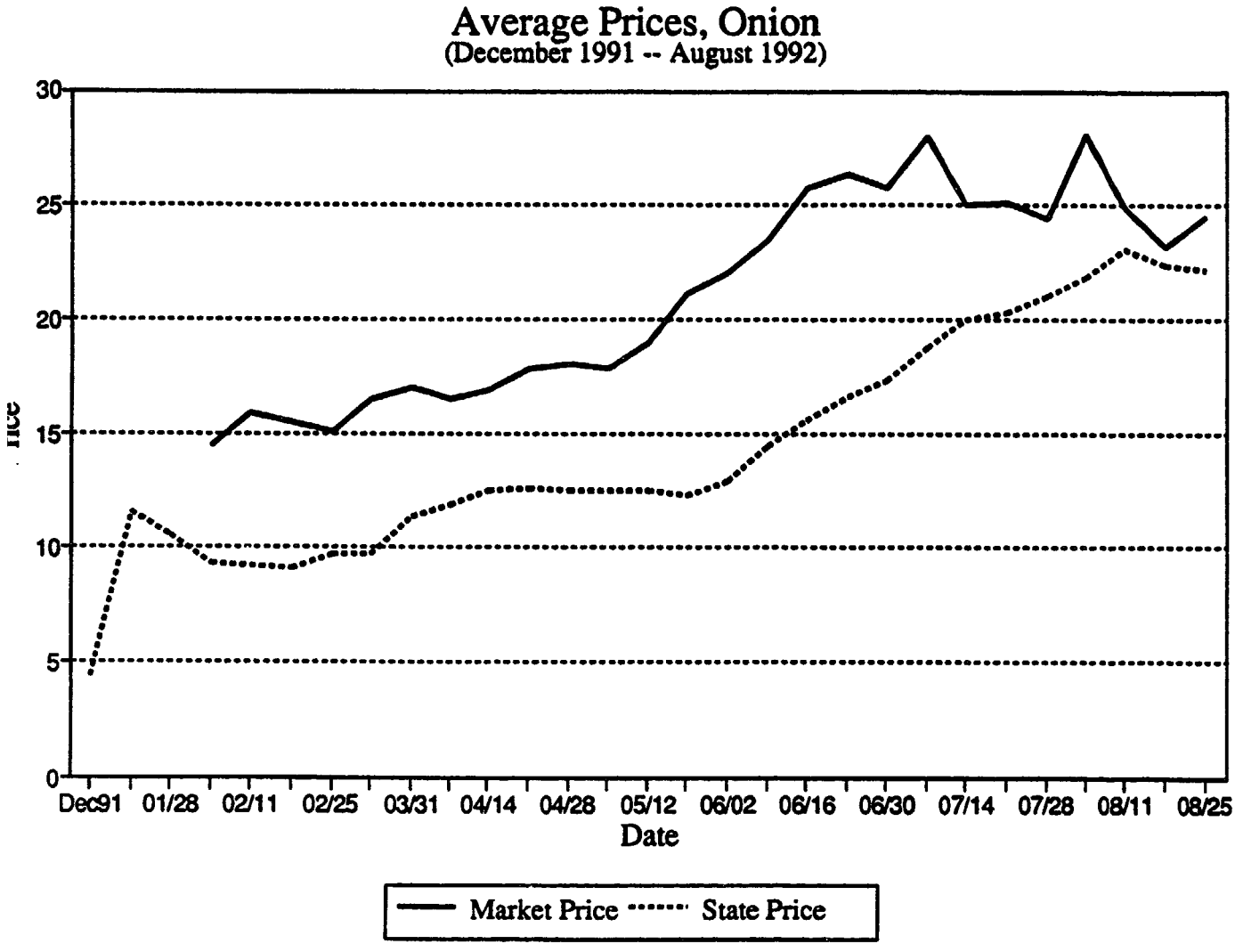

Volume in Monitored Outlets: Millet Groats
(01/21/92--08/25/92)
State Volume
(Thousands)
Market Volume
11
10
9
8
7
6
5
4
3
2
4000
3500
3000
2500
2000
1500
1000
500
0
01/21
02/04
02/18
03/17
04/07
04/21
05/05
05/19
06/09
06/23
07/07
07/21
08/04
08/18
Date
Market Volume
State Volume

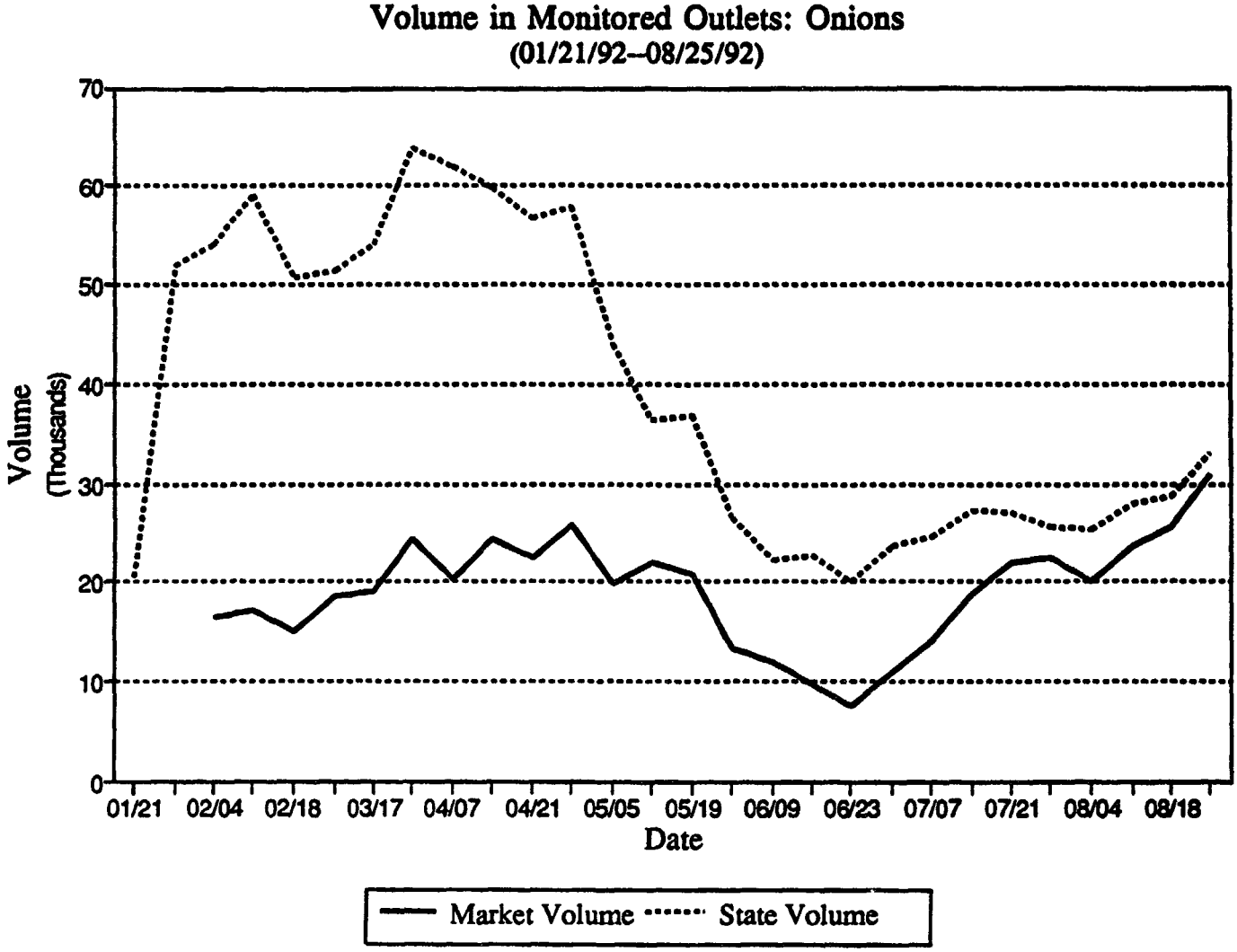

Average Prices, Vermicelli
(December 1991 -- August 1992)
60
50
40
30
20
10
0
Price
Dec91
01/28
02/11
02/25
03/31
04/14
04/28
05/12
06/02
06/16
06/30
07/14
07/28
08/11
08/25
Date
Market Price
State Price

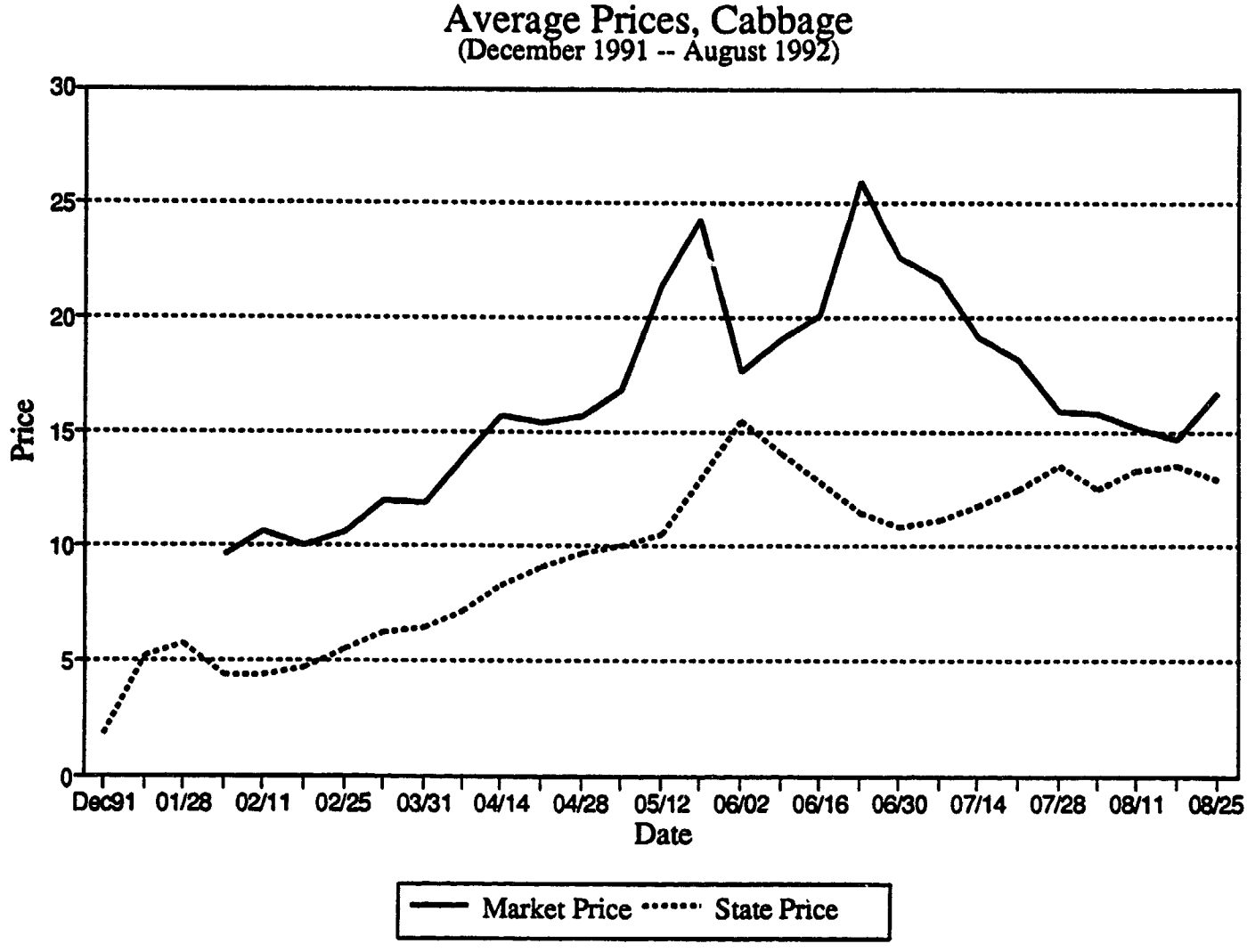

Volume in Monitored Outlets: Vermicelli
(01/21/92--08/25/92)
State Volume
(Thousands)
28
26
24
22
20
18
16
14
12
10
7000
6000
5000
4000
3000
2000
1000
0
Market Volume
01/21
02/04
02/18
03/17
04/07
04/21
05/05
05/19
06/09
06/23
07/07
07/21
08/04
08/18
Date
Market Volume
State Volume


Average Prices, Apple
(December 1991 -- August 1992)
Price
90
80
70
60
50
40
30
20
10
0
Dec91
01/28
02/11
02/25
03/31
04/14
04/28
05/12
06/02
06/16
06/30
07/14
07/28
08/11
08/25
Date
Market Price
State Price

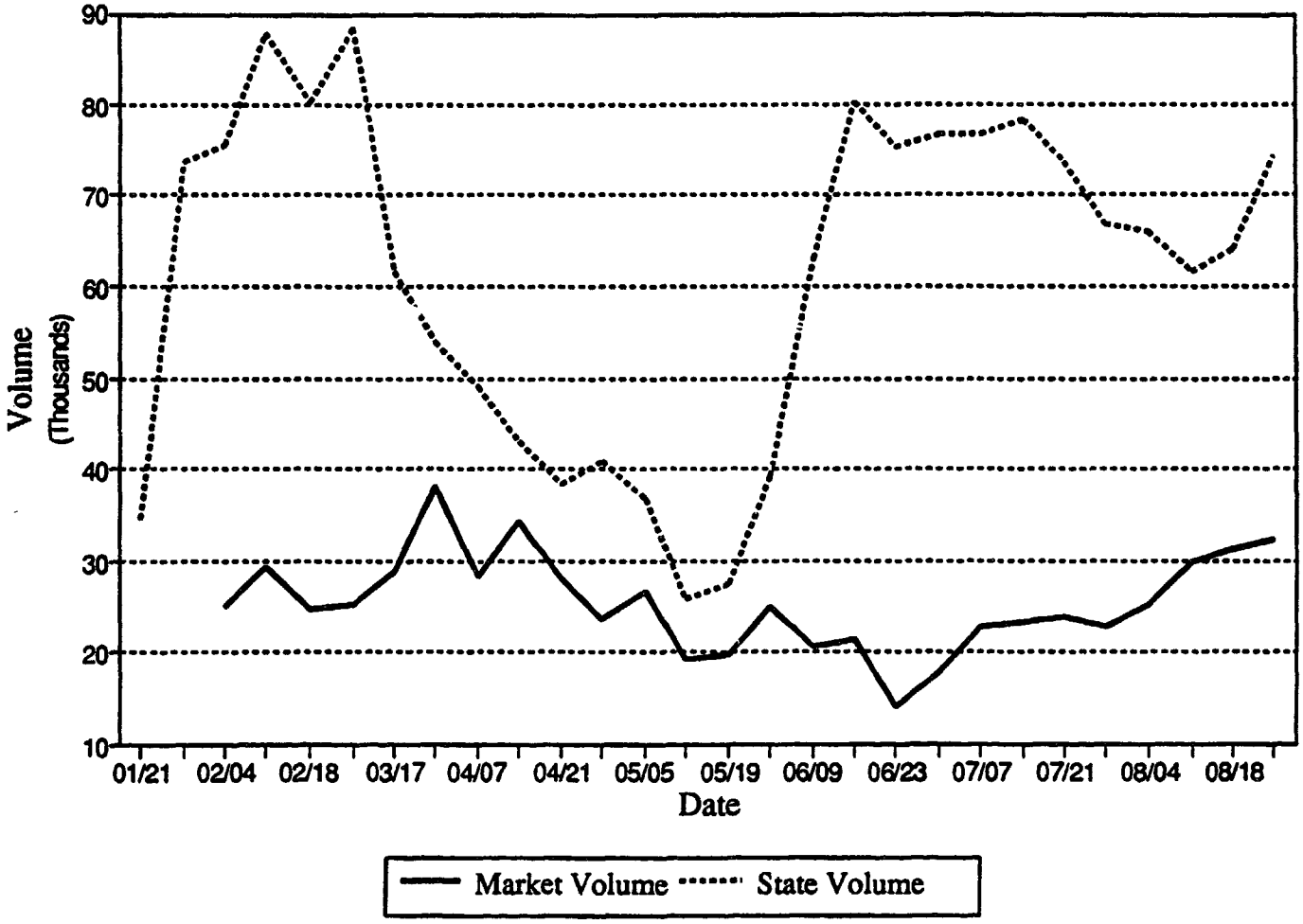

Volume in Monitored Outlets: Apples
(01/21/92--08/25/92)
Volume
(Thousands)
120
100
80
60
40
20
0
01/21
02/04
02/18
03/17
04/07
04/21
05/05
05/19
06/09
06/23
07/07
07/21
08/04
08/18
Date
Market Volume
State Volume

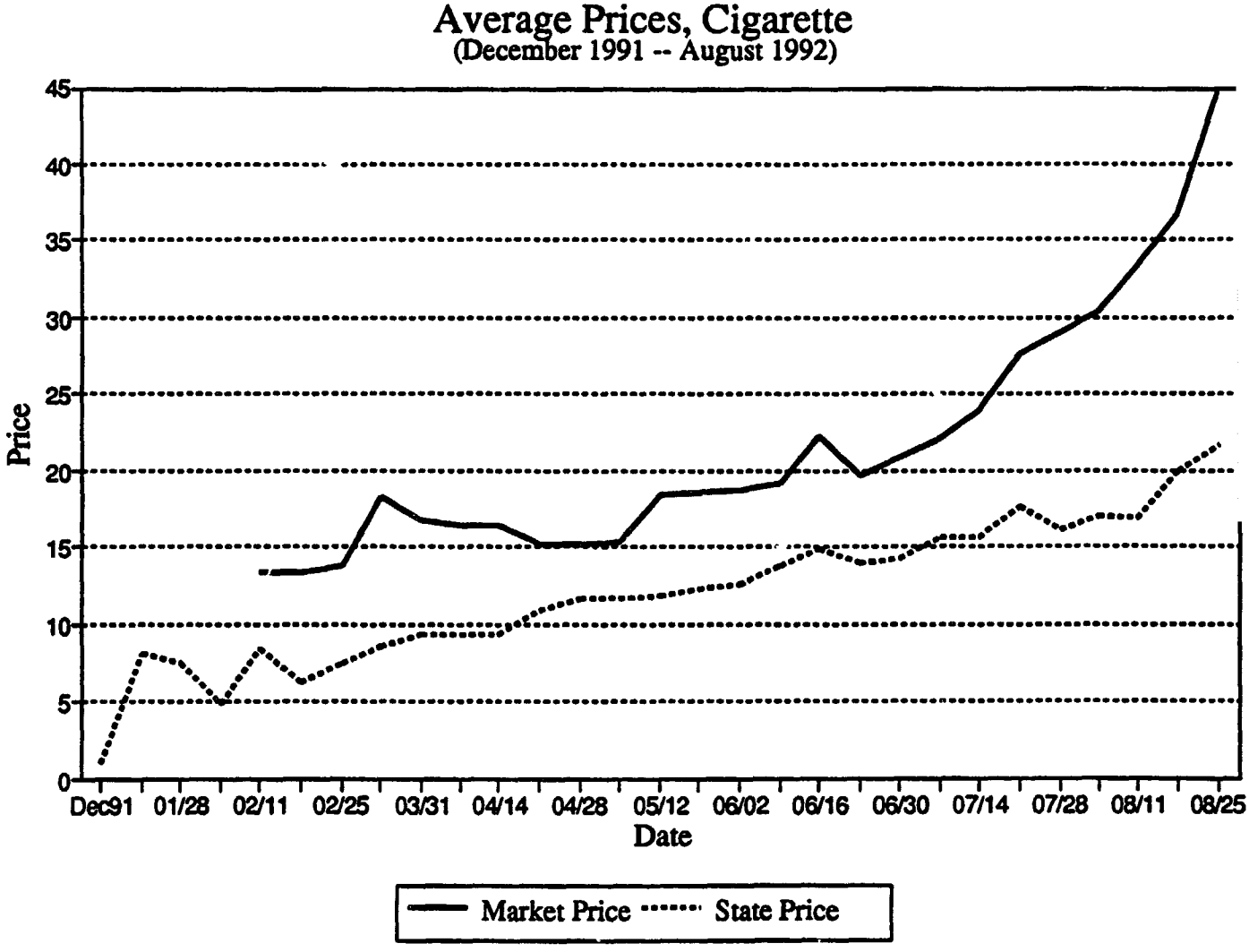

Average Prices, Onion
(December 1991 -- August 1992)
30
25
20
15
10
5
0
Dec91
01/28
02/11
02/25
03/31
04/14
04/28
05/12
06/02
06/16
06/30
07/14
07/28
08/11
08/25
Date
Market Price
State Price

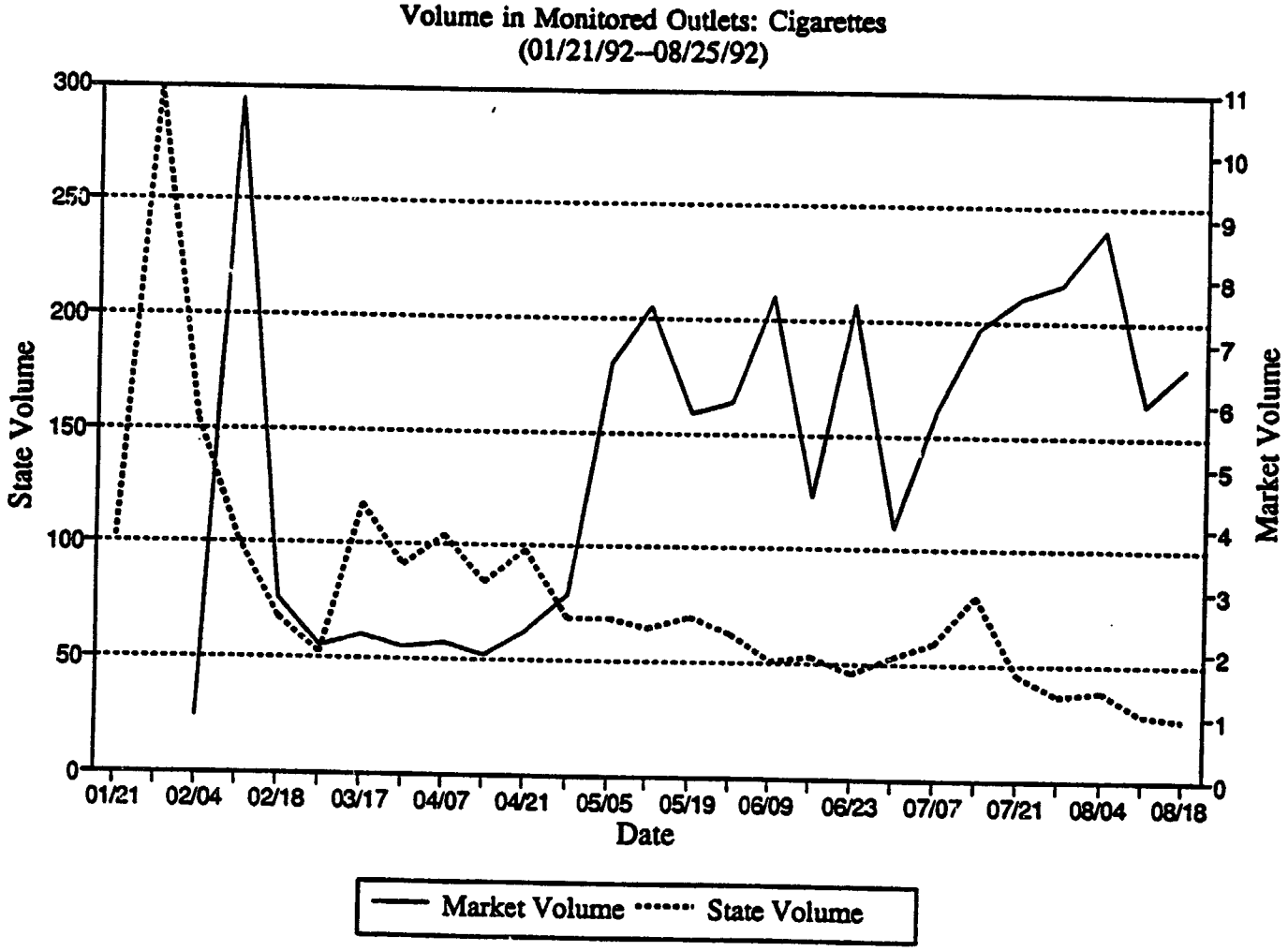

Volume in Monitored Outlets: Onions
(01/21/92--08/25/92)
Volume
(Thousands)
70
60
50
40
30
20
10
0
01/21
02/04
02/18
03/17
04/07
04/21
05/05
05/19
06/09
06/23
07/07
07/21
08/04
08/18
Date
Market Volume
State Volume


Average Prices, Cabbage
(December 1991 -- August 1992)
Price
30
25
20
15
10
5
0
Dec91
01/28
02/11
02/25
03/31
04/14
04/28
05/12
06/02
06/16
06/30
07/14
07/28
08/11
08/25
Date
Market Price
State Price

Volume in Monitored Outlets: Cabbage
(01/21/92--08/25/92)




Average Prices, Cigarette
(December 1991 -- August 1992)
Price
45
40
35
30
25
20
15
10
5
0
Dec91
01/28
02/11
02/25
03/31
04/14
04/28
05/12
06/02
06/16
06/30
07/14
07/28
08/11
08/25
Date
Market Price
State Price


Volume in Monitored Outlets: Cigarettes
(01/21/92--08/25/92)
State Volume
Market Volume
300
250
200
150
100
50
0
11
10
9
8
7
6
5
4
3
2
1
0
01/21
02/04
02/18
03/17
04/07
04/21
05/05
05/19
06/09
06/23
07/07
07/21
08/04
08/18
Date
Market Volume
State Volume

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